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termined by barometric observations with those obtained by the accurate method of the spirit-level. These observations were made on the line of the Central Pacific Railroad.

The Corresponding Secretary read a second portion of the report of the Council, namely, the eulogy of General George G. Meade.

Six hundred and fifty-seventh meeting.

May 13, 1873. — MONTHLY MEETING.

The PRESIDENT in the chair.

The President read a letter from the Massachusetts Historical Society, thanking the members of the Academy for the use of their Hall on several occasions; also a letter from Wilhelm Hofmeister, of Heidelberg, acknowledging his election into the Academy.

The President announced the death of an Associate Fellow, namely, W. S. Sullivant, of Columbus, Ohio. He also gave notice of the deaths of two Foreign Honorary Members, namely, Justus von Liebig, of Munich, and John Stuart Mill, of London.

A portion of the report of the Council was then read, namely, the eulogies of the late Francis Lieber and James Hadley.

Professor Joseph Winlock made a communication on a comet of 1867, which had a period of six years. It was identified on April 4, 1873, near its predicted place.

He also described a new method of illuminating the spider-lines of the telescopes in Harvard College Observatory, and a modification of the chronograph.

The President communicated the following botanical papers: —

Revision of the extra-tropical North American Species of the Genus Lupinus. By SERENO WATSON.

The latest revision of the Lupines is that in Torrey and Gray's Flora, made thirty-five years ago, and including all the species founded upon the collections of Douglas, Wyeth, and Nuttall. The amount of material that has since been gathered justifies an attempt at a rearrangement of the genus. In this revisal the herbariums of Dr. Gray, Dr. Torrey, Professor Eaton, and of the Philadelphia Academy have been consulted, and much aid in identifying many of the older species has been derived from notes made by Dr. Gray upon typical specimens in the British herbariums (especially that of Lindley, which was the basis of Agardh's Synopsis), which he examined and compared with his own specimens during his last visit to Europe.

In view of the peculiar difficulties that lie here in the way of determining specific differences and defining them, I can hope to have attained scarcely more than moderate success in giving clear and satisfactory descriptions. It will be seen, however, that there are three well-marked sections, the largest of which is conveniently divided into perennials and annuals. In the minor subdivisions, use is made mainly of differences in habit and in the number of ovules, which are found to be in most cases very constant. Little use is made of the characters of the seed, the differences in the calyx are mostly slight and not easily expressed, the color of the petals is often variable and changeable and in dried specimens uncertain, and peculiarities of pubescence or foliage, which in some cases seem very constant and reliable, in others are not to be depended upon. Several species still remain to some extent uncertain for want of sufficient material for comparison. Some new species have been indicated, though as many others have been reduced, and future explorations in the Lupine Region, from the Rocky Mountains to the Pacific, will doubtless add to the list.

Synopsis of Species.

§ 1. LUPINUS, proper. Flowers in terminal racemes; banner with strongly reflexed sides; ovules several; cotyledons petioled after germination; pods broadly linear. — Spec. 1 - 50.

* Unifoliolate perennials.

Pubescence villous, spreading; stipules elongated; leaves lance-oblong, acute; ovules 4 - 6 . . . 1. *L. villosus.*

Pubescence mostly appressed and short; stipules short; leaves oval or obovate, obtuse, short-petioled; ovules 6 - 10 . . . . 2. *L. diffusus.*

* * Perennial; leaflets 5 - 15. — Spec. 3 - 39.

† Shrubby at base, tall and leafy; pubescence silky, mostly appressed; leaflets 7 - 11; petioles short; bracts deciduous; flowers large; ovules many.

Pubescence not dense; leaflets glabrate above, narrowly lanceolate, acute; fls. yellow; calyx-lips subentire; ovules 10 - 12 . . . . 3. *L. arboreus.*

Pubescence dense; lfts. wedge-obovate, obtuse, silky both sides; fls. not yellow; upper lip bifid; ovules 6 – 8 . . . . 4. *L. albifrons.*

Pubescence short and mostly tomentose; lfts. oblanceolate, not smoother above; bracts exceeding the calyx; fls. blue; upper lip nearly 2-parted; ovules 8 – 9 . . . . 5. *L. Douglasii.*

† † Stems wholly herbaceous, more or less elongated, in (*a*) mostly succulent and fistulous.

a. Lfts. smooth above, oblanceolate, 1½′ long or more, except in *L. littoralis;* bracts deciduous; calyx-lips slightly toothed; ovules 8 or more.

Subdecumbent, densely villous; stipules long-setaceous; petioles short; lfts. 6 – 8; bracts short; ovules 9 – 12 . . . . 6. *L. Nootkatensis.*

Erect, sparingly villous; stipules broad; petioles elongated; lfts. 10 – 16; bracts short; calyx-lips entire; ovules 9 . . . . 7. *L. polyphyllus.*

Ascending, villous; leaves distant; petioles elongated; lfts. 8 – 12; bracts exceeding the calyx; ovules 7 – 8 . . . . 8. *L. Wyethii.*

Erect, nearly glabrous, the short pubescence mostly appressed; stipules narrow; petioles short; bracts exceeding the calyx; ovules 8 – 10 . . . 9. *L. rivularis.*

Calyx subvillous; bracts more hairy, subpersistent; stipules broader; lower petioles elongated; pedicels short . . . . 10. *L. Burkei.*

Subdecumbent, slender, leafy; petioles short; lfts. 5 – 8, ½ – 1′ long; bracts exceeding the calyx; keel ciliate; ovules 10 – 12 . . . . 11. *L. littoralis.*

b. Leaves distant, lower long-petioled; lfts. smooth above; fls. large, not yellow; ovules 6 – 7, rarely fewer.

Pubescence mostly minute, appressed; stipules deciduous; lfts. 9; upper calyx-lip shortly toothed; keel ciliate . . . . 12. *L. perennis.*

Usually villous, low and slender; stipules long, persistent; upper lip bifid; ovules 4 – 6 . . 13. *L. Nuttallii.*

Villous or subglabrous; stipules large, acuminate; lfts. 7; keel naked . . . . 14. *L. arcticus.*

c. Leafy and branching; petioles short; bracts deciduous, shorter than the calyx, except in *L. Sabinii* and *barbiger;* fls. large, yellow in *L. Sabinii*; ovules 6 – 7, rarely 8.

Lfts. silky both sides; fls. very large, yellow; banner naked . . . . 15. *L. Sabinii.*

Lfts. pubescent both sides; calyx-lips subequal, the upper narrow; banner acute, margins adherent at the apex; keel very falcate, naked . . 16. *L. albicaulis.*

Lfts. smooth above; upper lip shorter, broader; banner acutish; keel ciliate, less falcate . . 17. *L. Sitgreavii.*

Lfts. subappressed-silky both sides; pubescence of stem and pedicels dense and spreading; bracts long; banner silky; keel strongly bearded . 18. *L. barbiger.*

Lfts. 5 – 7; pubescence appressed, silky, usually short; banner silky; keel ciliate . . . 19. *L. ornatus.*

d. Leaves distant, not smooth above; lower petioles elongated; racemes mostly dense and fls. smaller, except in *L. sulphureus;* ovules 4 – 6.

Flowers yellow . . . . 20. *L. sulphureus.*

Pubescence villous, spreading; bracts deciduous, often exceeding the densely villous calyx; calyx-lips subequal; banner hairy; keel ciliate . . 21. *L. sericeus.*

Stout, densely silky-tomentose; pedicels very short; bracts subpersistent; banner very villous 22. *L. leucophyllus.*

Densely rough-pubescent with spreading hairs; pedicels short; bracts short, deciduous; banner subhairy . . . . 23. *L. Palmeri.*

Densely appressed-silky, leafy at base, often low; petioles elongated; bracts deciduous; banner naked . . . . 24. *L. lepidus.*

Silky-villous; raceme dense; bracts persistent, equalling the calyx; fls. verticillate; banner oblong, naked . . . . 25. *L. confertus.*

e. Leafy; petioles short; racemes short-peduncled; bracts deciduous, mostly short; fls. mostly small, not yellow; ovules 3 – 5.

Subdecumbent; pubescence mostly short; lfts. silky both sides; bracts at least equalling the calyx; banner very hairy; keel very ciliate . 26. *L. flexuosus.*

Erect, slender, much branched, puberulent; lfts. pubescent both sides; banner and keel naked . 27. *L. Andersoni.*

Erect, slender, strict, scantily puberulent; lfts. glabrous above; bracts equalling the silky calyx; banner naked . . . . 28. *L. parviflorus.*

Appressed-subsilky; lfts. oblanceolate, pubescent both sides; calyx strongly spurred; banner longest, hairy; keel ciliate . . . . 29. *L. calcaratus.*

Appressed puberulent; lfts. narrowly oblanceolate, pubescent both sides; calyx narrow, saccate; petals equal; banner subpubescent; keel ciliate 30. *L. laxiflorus.*

Appressed puberulent or silky; lfts. linear-lanceolate, smooth above; calyx campanulate, gibbous; petals equal; banner subhairy . . 31. *L. argenteus.*

Close silvery-silky; lfts. oblanceolate, very silky both sides; fls. often very small; calyx slightly spurred; banner pubescent; keel ciliate . . 32. *L. holosericeus.*

Densely silky-tomentose; lfts. silky both sides; bracts ovate; fls. very small; calyx campanulate; banner naked; ovules 3 – 4 . . . . . 33. *L. meionanthus.*

† † † Dwarf, short-stemmed and mostly cæspitose; bracts subpersistent; fls. subverticillate, short-pedicelled; keel ciliate; ovules 3 – 6.

Stems very short; racemes sessile; bracts exceeding the calyx; banner narrow . . . . . . 34. *L. cæspitosus.*

Stems with rather long internodes, herbaceous; racemes peduncled.

Loosely villous; bracts nearly equalling or exceeding the short calyx; lower lip subentire; ovules 4 – 6 . . . . 35. *L. aridus.*

Loosely villous; bracts short; calyx nearly equalling the petals; lower lip equally 3-toothed; banner short, narrow, rhomboidal; ovules 2 – 3; pod ovate . . . . 36. *L. Kingii.*

Appressed villous; bracts short, deciduous; calyx short, upper lip bifid; petals equal; banner orbicular . . . . 37. *L. minimus.*

Stems leafy, from a spreading woody caudex; racemes very short; bracts short; pubescence dense, appressed.

Lfts. 7 – 10, obtuse; petioles short; peduncles equalling the leaves; banner orbicular . . 38. *L. Breweri.*

Lfts. 5 – 6, acutish; petioles elongated; peduncles exceeding the leaves; banner elliptical . 39. *L. Lyallii.*

* * * Annuals; leaflets 5 – 10; upper calyx-lip 2-parted or bifid. — Spec. 40 – 50.

† Fls. verticillate; bracts deciduous.

Puberulent; lfts. cuneate-obovate, mostly obtuse, smoother above; bracts short . . . . 40. *L. affinis.*

Usually villous; lfts. linear to oblanceolate, acute, pubescent both sides; bracts elongated; fls. 3 - 6″ long; banner broad . . . . 41. *L. nanus.*

Villous; lfts. linear, pubescent; bracts short; pedicels very short; fls. 2 – 3″ long, narrow . . 42. *L. micranthus.*

† † Fls. scattered; bracts persistent in Nos. 46, 49, and 50.

a. Rather tall, slender; lfts. linear.

Lfts. 8 – 10, smooth above; bracts very long . 43. *L. leptophyllus.*

Villous; lfts. 5 – 9, much reduced upward; bracts short, subpersistent . . . . . 44. *L. sparsiflorus.*

Puberulent; lfts. 5 – 7, truncate; bracts short . 45. *L. truncatus.*
b. Lfts. 5 – 7, cuneate-obovate, sometimes oblanceolate in 49; bracts and petioles short.
Silky-pubescent; lfts. 5; Texan . . . 46. *L. subcarnosus.*
Puberulent; raceme short, dense; banner yellow, wings pink; pod smooth . . . . 47. *L. Stiveri*
Very hirsute, rather stout; petals 6″ long . 48. *L. hirsutissimus.*
Low, villous; petals 3 – 4″ long; lower calyx-lip narrow, rather deeply trifid . . . 49. *L. concinnus.*
Low, slender, very hairy; raceme few-flowered, flexuous; lower lip broad, subentire; fls. narrow, 2 – 3″ long . . . . 50. *L. gracilis.*

§ 2. PLATYCARPOS. Fls. as in § *Lupinus;* ovules 2; cotyledons broad and clasping; pods ovate; bracts persistent; lfts. cuneate-oblong or -obovate after germination; annuals.

* Fls. verticillate; stems tall; racemes long-peduncled.
† Leaves approximate, long-petioled.
Villous with long hairs; fls. mostly purple . . 51. *L. microcarpus.*
Less villous with shorter hairs; calyx nearly smooth; fls. yellow to white . . . . 52. *L. densiflorus.*
† † Leaves scattered; petioles short.
Pubescence short, appressed . . . . . 53. *L. Bridgesii.*
* * Fls. scattered; low or dwarf.
Very hirsute; lfts. usually 5; racemes nearly sessile; upper calyx-lip 2-cleft . . . . 54. *L. pusillus.*
Nearly acaulescent; less hairy; lfts. usually 7; peduncles about equalling the leaves; upper lip very short, truncate . . . . 55. *L. brevicaulis.*

§ 3. LUPINELLUS. Fls. axillary, solitary; sides of the banner scarcely reflexed; pod ovate; ovules 2.

Annual, dwarf, diffuse, villous; lfts. 5; fls. small . . 56. *L. uncialis.*

§ 1. LUPINUS, proper. Flowers in terminal racemes; banner with its sides strongly reflexed; ovules several (5 – 12); cotyledons petioled, after germination.

* Herbaceous perennials; leaflets solitary; pubescence densely silky; bracts deciduous; flowers subverticillate.

1. L. VILLOSUS, Willd. Stem stout, decumbent at base or ascending, 1 – 2° high, leafy; pubescence densely silky-tomentose and villous, especially on the stem and stipules; stipules 1 – 2′ long, setaceous; leaves lance-oblong, 2 – 6′ long, about equalling the petioles, acute; racemes 6 – 10′ long, often dense, short-peduncled; bracts about equalling or exceeding the calyx, subulate-setaceous; pedicels 1 – 2″

long; calyx nearly equalling the petals, the lips subequal and toothed, bractlets setaceous; petals pale-red, the rounded banner with a dark-purple centre; keel naked; ovules 4 – 6; pods densely villous, in a crowded cylindrical spike, 1′ long, 2 – 4-seeded. — Dry sandy barrens; Georgia to Florida and Alabama; April.

2. L. DIFFUSUS, Nutt. Resembling the last; procumbent; pubescence shorter, appressed, rarely subspreading; leaves short-oblong, 1 – 3′ long, obtuse and mucronulate, sometimes acutish, mostly exceeding the petioles; stipules 3 – 9″ long; bracts lanceolate or oblong, shorter than the calyx; calyx considerably shorter than the petals, and with shorter bractlets; flowers mostly smaller, 4 – 6″ long, light-blue, the banner with a greenish-yellow centre, less decidedly rounded, or acutish; ovules 6 – 10; pod densely covered with shorter stiffish hairs. — North Carolina to Florida.

* * Perennials; leaflets 5 – 15. — Spec. 3 – 39.

† Shrubby, at least at base, tall, branched, and leafy; pubescence silky, mostly appressed; leaflets 7 – 11; petioles rarely much exceeding the leaves; bracts deciduous; flowers large; calyx-lips nearly equal; ovules mostly 8 – 12.

3. L. ARBOREUS, Sims. Shrubby and often 4 – 10° high; pubescence not dense, short and silky, mostly appressed; leaflets 7 – 11, mostly 9, glabrate above, narrowly lanceolate, ¾ – 1¾′ long, acute; raceme loose, 3 – 8′ long; bracts linear, equalling the calyx; flowers verticillate or subscattered, sulphur-yellow, fragrant; pedicels 3 – 4″ long; calyx-lips broad, entire or the upper obscurely 2-toothed; bractlets minute; petals 6 – 8″ long, equal, keel slightly ciliate; pod 10 – 12- (rarely 8-) seeded, 1½ – 3′ long, 4 – 6″ wide, pubescent. — California, common, from Sacramento Valley to San Diego; April to August. Specimens from Punta de los Reyes (Bigelow) are remarkable for their more abundant villous pubescence, spreading upon the stem.

4. L. ALBIFRONS, Benth. Stems 1 – 4° high; pubescence dense, silky, appressed; leaflets 7 – 9, cuneate-obovate, ½ – 1′ long, obtuse and mucronulate, or acutish, silky on both sides; racemes loose; bracts lanceolate, shorter than the calyx; flowers subverticillate, blue, violet, pink, or white; pedicels 2 – 3″ long; calyx with small setaceous bractlets, upper lip deeply cleft, the lower subentire; petals 6″ long, equal or the banner slightly shorter, keel naked or ciliate; ovules 6 – 8; pod 1¼′ long, 4 – 6-seeded, silky. — From Oregon (Hall) to Southern Cali-

fornia, common. No. 615 Thurber, from San Pasqual, has stout, elongated, few-leaved stems, the raceme over 1° long, and the leaflets 2½′ long, but it evidently belongs here.

5. L. Douglasii, Agh. Apparently less woody; pubescence short, tomentose or silky, appressed; leaflets 7 – 9, oblanceolate, 1 – 1½′ long, obtuse or acute, sometimes cuneate-oblong, pubescent on both sides; racemes often long-peduncled; bracts linear-setaceous, exceeding the calyx; flowers blue or purple, scattered or subverticillate; pedicels 3 – 5″ long; calyx with long setaceous bractlets, the upper lip nearly 2-parted, the lower entire; petals equal, 6 – 7″ long, keel ciliate; ovules 8 – 9. — Sacramento Valley to Southern California.

† † Stems wholly herbaceous, more or less elongated, in (*a*) mostly succulent and fistulous.

a. Leaflets glabrous above, or nearly so, oblong to oblanceolate, 1½′ long or more (except in *L. littoralis*); flowers subverticillate; bracts deciduous; calyx-lips usually but slightly toothed; ovules 8 or more.

6. L. Nootkatensis, Donn. Stems often stout, 1 – 2° long, more or less decumbent, leafy; pubescence densely villous, spreading or subappressed; stipules elongated, setaceous-acuminate; leaflets 6 – 8, cuneate-oblong, obtuse and mucronulate or acutish, 1½ – 2′ long, about equalling the petioles; raceme elongated, nearly sessile; bracts linear-lanceolate, equalling the calyx; flowers blue or purplish, verticillate or scattered; pedicels 2 – 6″ long; calyx large, with long setaceous bractlets, the upper lip rather deeply bifid and the lobes often erosely truncate, the lower usually strongly 3-toothed; petals 8 – 9″ long, the keel a little shorter and usually naked; ovules 9 – 12; pod 1½′ long. — From Vancouver to the Aleutian and St. Paul Islands; "Kurile Islands" (Ledebour); "Ft. Youkon" (Rothrock); Jasper House (Burke).

Var. Unalaskensis. Stems slender; pubescence wholly short, silky and appressed; raceme short and few-flowered. — Unalaska Island (Eschscholtz, Rudolphi, and Harrington); Port Mulgrave (Barclay).

7. L. polyphyllus, Lindl. Stout, erect, 2 – 5° high, sparingly villous, the pedicels, calyx, and youngest leaves silky-pubescent; stipules large, triangular to subulate; leaves distant, long-petioled; leaflets 10 – 16, in the upper leaves often but 8 – 10, glabrous above, 2 – 6′

long, ½ – 1′ wide; raceme frequently 1 – 2° long; bracts oblong-lanceolate, equalling or shorter than the calyx; flowers mostly scattered, blue, purple, or white; pedicels 3 – 6″ long; calyx-lips subequal, entire, bractlets very caducous; petals equal, 6 – 7″ long, keel naked; ovules 9; pod 1′ long or more. — From Ft. Vancouver and the Lower Fraser River to Klamath Valley and San Francisco.

8. L. WYETHII. Stem ascending, stout, ½ – 2° high, sparingly leafy; pubescence villous, spreading; stipules setaceous; leaflets 8 – 12, oblong to oblanceolate, 1½ – 2½′ long, acute, glabrous above, the lower petioles much elongated; raceme 4 – 10′ long, often long-peduncled; bracts subulate-setaceous, exceeding the calyx; flowers blue or pink, scattered or subverticillate; pedicels slender, 3 – 4″ long; calyx villous, with short setaceous bractlets, upper lip 2-toothed, the lower one longer, subentire; petals equal, 6 – 7″ long, keel naked; ovules 7 – 8. — Flathead River, Oregon (Wyeth); Clear Water (Spalding).

9. L. RIVULARIS, Dougl. Stout, erect, 2 – 6° high, branching, nearly glabrous; pubescence short and silky, close-appressed or very rarely spreading on the calyx and pedicel; stipules subulate or setaceous; leaflets 7 – 10, about equalling the petioles, ½ – 5′ long, oblanceolate, acute or the lower ones obtuse, glabrous above; raceme long-peduncled, often 1 – 2° long; bracts setaceous, exceeding the calyx; flowers scattered or subverticillate, purple or sometimes white; pedicels 2 – 5″ long; calyx with caducous bractlets, the upper lip rarely entire; petals 6″ long, equal, the keel slightly ciliate; pod 1½′ long, 8 – 10-seeded. — From the Columbia to Southern California, common. The species has been known only from the figure (*Bot. Reg.* 19, *t.* 1595) and a cultivated specimen in Herb. Lindley. These seem to accord sufficiently well with the ordinary *L. cytisoides*, Agh., and the older name is retained.

Var. LATIFOLIUS. Leaflets 5 – 7, spatulate or oblanceolate, ½ – 1½′ wide, obtuse and mucronulate, or the upper acute, the pubescence on the calyx oftener spreading.

10. L. BURKEI. Resembling the last, but distinguished by broader stipules, the lower leaves long-petioled, the raceme usually short and dense, with pedicels mostly but 1 – 2″ long, bracts villous and subpersistent, pubescence of the calyx somewhat villous and more or less spreading; pod 8-seeded. — On the east side of the Sierra; near Carson City (46 Anderson, 262 Stretch); "Snake country" (Burke); Falls of the Yellowstone (Hayden).

11. L. LITTORALIS, Dougl. Stems slender, decumbent or ascending, 1 – 2° long, often not succulent, leafy; pubescence silky, rather thin, short and appressed, or villous and spreading, especially about the linear stipules; leaflets 5 – 8, oblanceolate or cuneate-oblong, ½ – 1′ long, acute, the petioles sometimes twice longer; raceme short; bracts setaceous, exceeding the calyx; flowers blue or violet, with more or less yellow, verticillate or scattered, on pedicels 2 – 3″ long; calyx large, with small bractlets, upper lip 2-toothed; petals equal, 6″ long, keel ciliate; ovules and seeds 10 – 12; pod 1¼′ long. — Near the coast, from Washington Territory to San Francisco. Douglas was probably mistaken in saying that the root is eaten by the Indians.

b. Rather sparingly leafy, the petioles (the upper excepted) at least twice longer than the leaflets; racemes loose; bracts mostly deciduous; flowers large, not yellow; ovules 6 – 7, rarely fewer; leaflets smooth above.

12. L. PERENNIS, L. Stems 1 – 2° high, from subterranean rootstocks; pubescence minute, appressed, with some longer hairs; stipules setaceous, deciduous; leaflets 7 – 11, obovate to oblong, 1 – 2′ long, obtuse and mucronulate, or obtusish; raceme ½ – 1° long; bracts subulate, usually shorter than the calyx; flowers purplish or rarely white, scattered or subverticillate; pedicels slender, 2 – 4″ long; bractlets small; upper calyx-lip shortly toothed, the lower subentire; petals equal or the banner shorter, 5 – 7″ long, the keel ciliate; pod 1½′ long, 4″ wide, 5 – 6-seeded. — Sandy soils; Northern States and " Canada " to Wisconsin, and southward to the Gulf; Valley of the Platte (Engelmann).

Var. OCCIDENTALIS. Stem and petioles more villous. — Michigan and Wisconsin.

13. L. NUTTALLII. (*L. gracilis*, Nutt., not Agh.) Low and more slender throughout than the last, and usually villous; stipules persistent, elongated, setaceous; upper lip of the calyx more deeply toothed; flowers smaller, 4 – 5″ long; ovules 4 – 6; pod 1′ long, 3″ wide. — Georgia, Florida, and westward to Mississippi.

14. L. ARCTICUS. Villous or subglabrous; stems rather stout, 1° high or less, erect or ascending, simple; stipules conspicuous, acuminate; leaflets 6 – 8, cuneate-oblong or oblanceolate, 1 – 1½′ long, acute or obtuse, the petioles much elongated; raceme 2 – 4′ long; bracts linear, about equalling the calyx, deciduous or subpersistent; flowers

blue, subverticillate or scattered, on slender pedicels 2 – 3″ long; bractlets wanting or caducous; calyx-lips short, the upper entire or slightly toothed, the lower a little longer; petals 6 – 7″ long, the banner shorter, keel naked; ovary slightly hairy, 5 – 7 ovuled. — Washington Territory (Lyall); Vancouver's Island (C. B. Wood); Bear Lake (Richardson); Polar Sea (Dean and Simpson); and probably all the *L. perennis* reported from the Arctic coast.

c. Leafy and branching, the petioles not longer than the leaflets; flowers large, subverticillate, yellow in *L. Sabinii*; bracts deciduous, shorter than the calyx (except in *L. Sabinii* and *barbiger*); ovules 6 – 7, rarely 8.

15. L. SABINII, Dougl. Erect, 2° high; pubescence short, appressed, silky; stipules long, setaceous; leaflets 8 – 11, oblanceolate, 1 – 2½′ long, acute, silky both sides; raceme 6 – 10′ long, rather dense and long-peduncled; bracts linear-setaceous; pedicels 3 – 4″ long; calyx minutely bracteolate, upper lip shorter and shortly toothed, the lower entire; petals equal, 7 – 8″ long, the banner emarginate, naked, keel ciliate; ovules 7. — Collected only by Douglas in the Blue Mountains, Oregon.

16. L. ALBICAULIS, Dougl. Ascending or erect, 1 – 2° high; pubescence variable, short and appressed or more or less villous and spreading; stipules linear-setaceous, long or nearly obsolete; leaflets 5 – 9, oblanceolate or oblong, 1 – 2′ long, acute, pubescent both sides; raceme 4 – 12′ long, short-peduncled; bracts subulate; pedicels 2 – 3″ long; calyx large, minutely bracteolate, lips nearly equal, the upper narrowed, shortly 2-toothed, the lower subentire; petals equal, 5 – 7″ long, "blue-violet" or often apparently rose-color or whitish; banner acute, naked, the margins adherent at the apex; keel strongly falcate, naked; ovules 5 – 7; pod 1 – 2′ long, 4 – 5″ wide, 3 – 6-seeded. — From the Columbia to the Sacramento. No. 188 of Kellogg & Harford appears to belong here, but is unusually smooth, the leaves distant and the lower on very long petioles.

Var. BRIDGESII. The more villous form, with largest flowers and densest racemes. — Near San Francisco.

17. L. SITGREAVII. Tall, 2° high or more, branched, puberulent, and more or less silky-villous with spreading hairs; stipules setaceous; leaflets 7 – 9, glabrous above, oblanceolate, acute, 1 – 3′ long; raceme short-peduncled; upper lip of the calyx short and rather broad, shortly

toothed or nearly entire; petals 5″ long, the banner rounded, naked, the keel ciliate; ovules 5. — San Francisco Mts., Arizona (Sitgreave, 1851; Wheeler, 1872); Copper Mines, New Mexico (Bigelow). To this perhaps belongs also 2012 Brewer, from Ebbett's Pass in the Sierra, scarcely at all villous and the keel naked, as also 1020 Wright, from the mountains of New Mexico, resembling Brewer's plant, but with the stipules longer and more conspicuous.

18. L. BARBIGER. Pubescence upon the stem, pedicels and petioles dense, of short, stiffish, spreading hairs, upon the leaves and calyx silky-hairy and subappressed; stipules setaceous; leaflets 5 – 7, narrowly oblanceolate, silky on both sides; raceme rather dense, short-peduncled; pedicels 2 – 3″ long; bracts setaceous, exceeding the calyx; lower calyx-lip narrow, subentire, slightly longer than the broader rather deeply toothed upper lip; petals 5″ long, ochroleucous, equal, the banner rounded, silky, the keel copiously ciliate; ovules 7. — Collected in Kane County, Southern Utah, 1873, by A. L. Siler.

19. L. ORNATUS, Dougl. Stems decumbent or ascending; pubescence usually short, more or less silky, mostly appressed; stipules setaceous; leaflets 5 – 7, oblanceolate or cuneate-oblong, ¾ – 2′ long, acute or acutish; raceme 3 – 8′ long, usually short-peduncled; bracts short, subulate or ovate; pedicels 2 – 3″ long; bractlets setaceous; calyx-lips nearly equal, the upper rather shortly toothed or bifid, the lower subentire; petals blue, equal, 5 – 7″ long, the banner acutish, subsilky on the back, keel ciliate; ovules 5 – 8; pod 1¼′ long, 3 – 4″ wide. — From the Columbia River to Southern California.

L. leucopsis, Agh., collected by Douglas in "Oregon and Rocky Mts.," appears to be the same. Specimens from Clark's Ranch, Mariposa Valley (Dr. Gray), may probably be referred here as an extreme form, being densely tomentose, the leaflets nearly obovate, and banner but slightly bearded.

Var. GLABRATUS. Leaflets glabrous above, cuneate-oblong, acutish or obtuse; flowers nearly white, with a dark-purple spot upon the banner. — Common in the Rocky Mountains of Colorado.

d. Leaves distant; lower petioles elongated; leaflets not smooth above; racemes mostly dense; flowers smaller and not yellow (except in *L. sulphureus*); ovules 4 – 6.

20. L. SULPHUREUS, Dougl. A not fully identified species. Described as with 13 – 15 densely silky leaflets, keel naked and banner

subglabrous. Nothing in our herbariums accords with this. A specimen collected by Spalding, and noted by Dr. Gray as the same as Douglas's plant in the Kew herbarium, has ascending sparingly leafy stems, 1½° high; pubescence silky, loosely appressed; leaflets 8 – 10, acute, 1 – 2′ long, narrowly lanceolate; raceme rather dense, peduncled; bracts deciduous; flowers subverticillate; pedicels 1 – 2″ long; calyx short and short-lipped, the upper lip slightly 2-toothed; petals 4 – 5″ long, apparently yellow, the banner slightly hairy and keel ciliate; ovules 4 – 5.

A specimen of Wyeth's from "Medicine Clay Prairie," noted as "pale-yellow with a dark spot in the centre of the vexillum," much resembles this, but has flowers 6 – 7″ long, slender pedicels, and the banner naked. Another very similar plant of Douglas's, from the junction of Lewis's and Clark's rivers, named *L. sericeus* in herb. Bentham, has also longer and more slender pedicels, longer calyx-lobes, the banner naked, and the leaves more numerous and with shorter petioles. Still another specimen of Douglas's from "Oregon or Rocky Mts.," referred to *L. sericeus* in Torr. & Gray's Flora, has both banner and keel naked. These are both apparently yellow.

21. L. SERICEUS, Pursh. Rather stout, suberect, 1 – 2° high; pubescence more or less coarsely villous or subsilky, spreading; stipules usually long-setaceous; leaflets 5 – 8, rarely 10, narrowly oblanceolate, 1 – 2½′ long, acute; racemes short-peduncled; bracts deciduous, subulate-setaceous, often much exceeding the calyx; flowers subverticillate or scattered, on short pedicels, blue or ochroleucous; calyx strongly gibbous but scarcely saccate, minutely bracteolate, densely silky-villous, lips nearly equal, the upper slightly toothed, the lower subentire; petals equal, 6″ long, banner hairy, keel ciliate; ovules 4 – 5; pod densely hairy, 1′ long. — Oregon to Northern Nevada and the Wahsatch.

22. L. LEUCOPHYLLUS, Dougl. Stout, 2 – 3° high, leafy, densely silky-tomentose throughout; stipules long-setaceous or subulate; leaflets 7 – 10, oblanceolate or cuneate-oblong, 1 – 2½′ long, acute, the petioles about equalling the leaves or the lower twice longer; raceme dense, 6 – 12′ long, sessile or nearly so; bracts subulate or linear, shorter or longer than the calyx, subpersistent or deciduous; flowers scattered or subverticillate, nearly sessile; bractlets small, setaceous or oblong-subulate; upper calyx-lip rather broad, more or less deeply 2-cleft, the lower slightly longer, subentire; petals blue or pink, equal, 4 – 6″ long,

banner densely villous, keel naked or ciliate ; ovules 5 – 6. — From the Cascade Mts. of Oregon and Washington Territory eastward to Utah and New Mexico.

23. L. Palmeri. Densely rough-pubescent with rather rigid, straight, spreading hairs, more appressed upon the leaves; stipules very small; leaflets 6 – 8, oblanceolate, acute, ½ – 1′ long, the petioles 3 – 4 times longer; raceme peduncled, rather loose; bracts subulate, shorter than the calyx, deciduous; flowers scattered or subverticillate, on pedicels 1″ long; calyx with broad subequal lips, the upper 2-toothed, the lower subentire and mostly erect; petals 4 – 5″ long, equal, deep-blue, the broad banner with a dark spot in the centre, somewhat hairy on the back; keel naked; ovules 5 – 6. — San Francisco Mts., Arizona (Dr. E. Palmer).

24. L. lepidus, Dougl. Slender, 9′ – 2° high, leafy at base, densely appressed-silky; stipules setaceous; leaflets 7 – 9, narrowly oblanceolate, ¾ – 1½′ long, acute, petioles much elongated; raceme 2 – 8′ long; bracts not exceeding the calyx, caducous; flowers in near verticils or scattered, pedicels 1 – 2″ long; upper calyx-lip 2-toothed or deeply cleft, the lower 3-toothed or subentire; petals violet, whiter at base, equal, 5″ long, the keel ciliate; ovules 4 – 6; pod 1′ long. — Washington Territory and Oregon, from Puget Sound to Klamath Lakes.

25. L. confertus, Kellogg. Erect or ascending, 1° high or more, branching; pubescence silky-villous, appressed or spreading; leaflets 5 – 8, cuneate-oblong to narrowly oblanceolate, ¾ – 1¾′ long, acute; raceme usually dense, 2 – 9′ long, rather long-peduncled; bracts persistent, about equalling the calyx, setaceous; flowers verticillate, nearly sessile; upper calyx-lip 2-cleft, lower slightly 3-toothed; petals equal, blue or pink, 4 – 5″ long, the banner rather narrow, keel ciliate; ovules 4 – 6; pod ¾′ long, 2 – 4-seeded. — In the Sierra, from Yosemite Valley to Washoe Lake and Donner Pass.

e. Stems leafy; petioles short; racemes short-peduncled; bracts deciduous, mostly short; flowers usually small, not yellow; ovules 3 – 5.

26. L. flexuosus, Lindl. Stems ascending or decumbent, 1½° high, branching; pubescence short, silky, and appressed, or subvillous on the leaves; stipules linear-setaceous; leaflets 6 – 8, oblanceolate, 1 – 1½′ long, acute, silky on both sides; raceme 3 – 6′ long or more; bracts lanceolate-setaceous, equalling or much exceeding the calyx; flowers subverticillate, pedicels 2 – 3″ long; calyx-lips nearly equal,

the upper slightly toothed, the lower subentire; bractlets short, setaceous; petals apparently blue or flesh-color, equal, 5″ long, banner very hairy, keel strongly ciliate; ovules 5 – 4; pod 1′ long. — Columbia Valley.

27. L. ANDERSONI, Watson. About 1° high, slender, much branched and leafy, minutely pubescent; stipules small, subulate; leaflets 7 – 9, oblanceolate, ¾ – 1¼′ long, acute or obtuse and mucronulate, pubescent both sides; raceme becoming 6′ long; flowers subverticillate or scattered, pedicels 1 – 2″ long; calyx campanulate, not at all saccate, obscurely bracteolate, lips subequal, upper broad and shortly toothed, lower subentire; petals blue or pink, equal, 4″ long; banner and keel naked; ovules 5 – 6; pod pubescent, 1¼′ long. — In the Sierra Nevada, near Carson City (Anderson).

Var. (?) GRAYI. Leaflets obovate, 6 – 9″ long, obtuse or emarginate, mucronulate; the whole plant densely silky-villous. — Clark's Ranch, Mariposa Valley, California (Dr. Gray).

28. L. PARVIFLORUS, Nutt. Strict, erect, slender, 2 – 3° high, at length branching; pubescence scanty, short, appressed, the calyx and pedicels silky; stipules setaceous; leaves rather distant; leaflets 5 – 11, oblanceolate to obovate, 1 – 2′ long, acute or obtuse and mucronulate, glabrous above, the lower leaves shorter than the petioles; raceme ½ – 1° long, slender; bracts linear-subulate, equalling the calyx; flowers subverticillate or scattered, the slender pedicels 1 – 2″ long; calyx-lips nearly equal, the upper 2-toothed; petals light-blue, equal, 3 – 4″ long, keel ciliate or naked; pod ¾′ long, 2 – 4-seeded, pubescent. — In the mountains from the Columbia River to Northern Utah and the Yosemite Valley. Stems usually solitary, the root-stock probably creeping.

29. L. CALCARATUS, Kellogg. Stems rather stout, 1 – 2° high, ascending, branched, puberulent; leaves more or less silky on both sides; stipules subulate or setaceous; leaflets 6 – 12 (about 9), oblanceolate, 1 – 2′ long, acute, at least half as long as the petioles; racemes 3 – 6′ long; bracts subulate; flowers verticillate or scattered, on pedicels 1 – 3″ long; calyx silky-pubescent, conspicuously spurred, upper lip shortly toothed, the lower subentire, a little longer; bractlets small, setaceous; petals white or blue, the banner pubescent, 6″ long, exceeding the wings and ciliate keel; ovules 4 – 6; pod ¾ – 1′ long, hairy. — Northern Nevada and eastern slope of the Sierra.

30. L. LAXIFLORUS, Dougl. Ascending or erect, 1 – 2° high, slen-

der; pubescence minute, silky, appressed; stipules setaceous, mostly very small; leaflets 6 – 8, narrowly oblanceolate, 1 – 2′ long, acute, puberulent on both sides, at least half as long as the petioles; racemes loose and slender, 3 – 6′ long; bracts subulate; flowers subverticillate or scattered, small, on pedicels 2 – 3″ long; calyx narrowed and saccate at base, minutely bracteolate, upper lip shortly toothed, the lower subentire and a little longer; petals blue, 3 – 5″ long, equal; banner subpubescent, keel ciliate; ovules 4 – 6; pod $\frac{3}{4}$′ long, very hairy. — Washington Territory and Oregon, from Ft. Vancouver to Klamath Valley and the northern Sierra, and eastward to Northern Utah. *L. arbustus*, Dougl., is a rather stouter, larger-leaved form, the leaflets sometimes 2$\frac{1}{2}$′ long.

31. L. ARGENTEUS, Pursh. Erect or ascending, 1 – 2° high, slender; pubescence minute, silky, appressed; stipules small; leaflets 5 – 8, linear-lanceolate, $\frac{3}{4}$ – 1$\frac{1}{2}$′ long, acute, smooth above or nearly so, about equalling the petioles; racemes 2 – 6′ long, nearly sessile; flowers subverticillate or scattered, pedicels $\frac{1}{2}$ – 2″ long; calyx campanulate, gibbous but not spurred at base, minutely bracteolate, upper lip broad, 2-toothed, the lower subentire, slightly longer; petals blue or cream-colored, equal, 3 – 4″ long, the banner very broad, naked or subhairy, keel naked or subciliate; ovules 5 – 3; pod $\frac{3}{4}$ – 1′ long. — Plains of the Columbia and Snake Rivers. Distinguished from the last chiefly by the shape of the calyx and smoother leaves; including its varieties, this is the most widely diffused of the western species.

Var. DECUMBENS. (*L. decumbens*, Torr.) Raceme dense and many-flowered; stem usually stouter and more leafy. — In the Rocky Mts., from Montana to New Mexico.

Var. ARGOPHYLLUS. With the habit of var. *decumbens*, but more copiously silky-pubescent, the leaflets nearly or quite equally so upon both sides, longer than the petioles; flowers larger, 5 – 6″ long, blue or ochroleucous, the calyx decidedly spurred. Approaching nearly to *L. laxiflorus*. — Montana to New Mexico.

32. L. HOLOSERICEUS, Nutt. Erect or ascending, 1 – 1$\frac{1}{2}$° high; pubescence silvery-silky, closely appressed; stipules short; leaflets 6 – 8, narrowly oblanceolate, $\frac{3}{4}$ – 1$\frac{1}{4}$′ long, acute, very silky both sides, at least half as long as the petioles; racemes 3 – 6′ long, nearly sessile; flowers often very small, verticillate, pedicels 1 – 2″ long; calyx slightly spurred at base, minutely bracteolate, lips nearly equal, the upper broad and shortly toothed, lower subentire; petals apparently

flesh-color, 2 – 5″ long, equal or the banner longer; banner very broad, pubescent on the back; keel ciliate; ovules 4 – 3; pod 1′ long. — Columbia Valley (Nuttall), and southward east of the Sierra to Southern Nevada.

Var. UTAHENSIS. Stouter; the leaflets oblong-lanceolate, 1 – 1¾′ long, 3 – 6″ wide. — Mountains of Northern Utah.

33. L. MEIONANTHUS, Gray. Ascending or erect, 1° high; pubescence dense, silky-tomentose; stipules minute; leaflets 5 – 7, oblong to oblanceolate, ¾ – 1′ long, acutish, silky both sides, about equalling the petioles; racemes short and small, scarcely peduncled; bracts ovate; flowers very small, subverticillate, on pedicels ½ – 1″ long; calyx campanulate, not spurred, densely tomentose, very obscurely bracteolate, lips nearly equal, the upper broad and toothed with a wide sinus, the lower subentire; petals blue, equal, 2″ long, scarcely exceeding the calyx, banner very broad, naked, keel slightly ciliate; ovules 3 – 4; pod ½′ long, 3″ broad. — Collected only by Anderson, Carson City, Nevada.

† † † Dwarf, short-stemmed and mostly cæspitose; racemes mostly short and dense; bracts subpersistent; flowers subverticillate, short-pedicelled; calyx with the upper lip 2-cleft (or 2-toothed in *L. aridus*), the lower 3-toothed; keel ciliate; ovules 3 – 6; pod hairy, 3 – 4-seeded (1 – 2-seeded in *L. Kingii*).

34. L. CÆSPITOSUS, Nutt. Stems very short and cæspitose; pubescence dense, villous, appressed; leaflets 5 – 7, oblanceolate, ½ – 1′ long, acute, the petioles thrice longer; racemes sessile, shorter than the leaves; bracts setaceous, exceeding the calyx; petals pale-blue, equal, 3 – 4″ long, the banner narrow, 2″ broad; pod ½′ long.—Rocky Mountains of Colorado and "Oregon" (Nuttall).

35. L. ARIDUS, Dougl. Stems cæspitose, 2 – 3′ long, with rather long internodes; pubescence villous, loose, and appressed; leaflets 5 – 7, oblanceolate, acute, ¾ – 1′ long, the petioles 3 – 4 times longer; raceme dense, 2 – 3′ long, the peduncle shorter than the leaves; bracts nearly equalling the calyx; upper calyx-lip shortly toothed, the lower subentire; petals purple, 5″ long, nearly twice longer than the calyx, the elliptical banner usually shorter; pod 5″ long, very hairy. — Washington Territory and Oregon.

Var. LOBBII. (*L. Lobbii*, Gray MS. in herb.) Differing chiefly in the more strongly toothed lips of the calyx; peduncles exceeding the leaves; leaflets obovate or oblanceolate, ½′ long, the petioles 2 – 3 times longer; banner broader. — Intermediate between *L. aridus* and *L. minimus*. In the high Sierras of California.

Var. UTAHENSIS. Racemes 3 – 6′ long, shorter than the very long-petioled leaves; bracts setaceous, exceeding the flowers; petals purplish, 4″ long, the banner shorter. — Parley's Park in the Wahsatch (Watson).

36. L. KINGII. Stems apparently from a perennial subterranean rootstock, diffusely branched, leafy; pubescence villous, spreading; leaflets oblong-lanceolate, ¾ – 1′ long, acutish or obtuse, the petioles twice longer; racemes on slender peduncles equalling the leaves; bracts short; calyx nearly equalling the petals, the lower lip equally 3-toothed; petals purplish, 4″ long, the narrow rhomboidal banner shorter than the wings; ovules 2 – 3; pod ovate, 5″ long, 1 – 2-seeded. — Heber Valley in the Wahsatch (Watson). At first mistaken for the last, which it much resembles.

37. L. MINIMUS, Dougl. Appressed silky-villous, 3 – 6′ high; leaflets 5 – 9, obovate or oblanceolate, 3 – 8″ long, mostly acutish, the petioles 3 – 4 times longer; peduncles equalling or exceeding the leaves; bracts short, deciduous; calyx half the length of the petals, upper lip deeply bifid; petals purple, 4 – 5″ long, equal, the banner orbicular. — Oregon and Washington Territory.

38. L. BREWERI, Gray. Stems 2 – 6′ long, from a spreading branched woody caudex, very leafy; pubescence dense, silky, appressed; leaflets 7 – 10, obovate, obtuse, 4 – 6″ long, the petioles 1 – 2 times longer; racemes very short, peduncles equalling the leaves; bracts short; calyx-lips nearly equal, the upper deeply bifid, the lower shortly and equally toothed; petals blue, equal, 3 – 4″ long, the banner orbicular. — Sierra Nevada, California; alpine.

39. L. LYALLII, Gray. Stems leafy, from a spreading woody caudex; pubescence dense, villous, appressed; leaflets 5 – 6, obovate, 3 – 4″ long, acutish, the petioles 3 – 4 times longer; racemes very short, the peduncles much exceeding the leaves; bracts short; calyx-lips nearly equal; petals purple, 5″ long, nearly equal, the banner elliptical. — Summit of the Cascade Mountains, Washington Territory (Lyall).

Var. DANAUS. (*L. Danaus*, Gray.) Stems less leafy; pubescence rather sparse; petals nearly white, the keel tipped with dark-purple. — Mt. Dana, California, at 12,500 feet altitude. The comparison of a larger amount of material may modify the definition of some of these alpine species.

* * * Annuals, erect; leaflets mostly 5 – 7 (in *L. leptophyllus*, 8 – 10); upper calyx-lip 2-parted or bifid; keel mostly ciliate.

† Flowers verticillate; bracts deciduous.

40. L. AFFINIS, Agh. Pubescent with very short spreading or subappressed hairs, 1° high, branched; leaflets broadly cuneate-obovate, 1′ long, emarginate or rounded at the apex, glabrous or smoother above, half as long as the petioles; racemes long-peduncled; bracts short; lower calyx-lip entire or equally 3-toothed; petals 5″ long, nearly equal, bluish-purple and white, the keel usually naked; ovules 5 – 9; pod 1 – 1½′ long. — From San Francisco to San Diego; an early spring flower. Near the larger flowered form of *L. nanus*, with which it was confounded by Agardh himself, but distinguished by its short pubescence, broader and obtuser leaflets, usually smooth above, and its short bracts. *L. cervinus*, Kellogg, is probably only a stout form of this species.

41. L. NANUS, Dougl. Slender, ½ – 1° high, branching often from the base, villous with spreading hairs or only short-pubescent; leaflets linear to oblanceolate, ½ – 1′ long, acute, pubescent on both sides, the petioles 1 – 3 times longer; racemes loose, 2 – 6′ long; bracts mostly exceeding the calyx and attenuate; pedicels slender, 2 – 3″ long; upper calyx-lip 2-cleft, the lower entire or slightly toothed; petals 3 – 6″ (usually 5 – 6″) long, very broad, bluish-purple, the banner at first nearly white, spotted with dark-purple lines, the white turning to reddish-purple; ovules 6 – 9; pod ½ – 1¼′ long, 4 – 8-seeded. — From Sacramento Valley to Southern California and Western Arizona. Flowering in spring; quite variable in the size of its flowers and breadth of the leaflets.

42. L. MICRANTHUS, Dougl. Near the last; slender, branching from the base, 3 – 12′ high, villous; leaflets linear, ¼ – 1′ long; racemes short, usually rather crowded; bracts shorter than the calyx; pedicels ½ – 1″ long; calyx-lips broad, the upper with two short triangular lobes, the lower obtuse and subentire or slightly toothed; petals 2 – 3″ long, the wings and banner very narrow. — From Puget Sound to Southern California.

Var. MICROPHYLLUS. (*L. microphyllus*, Nutt. MS.) A lower and more hirsute form, with leaflets but 3 – 6″ long. San Diego.

Var. TRIFIDUS. (*L. trifidus*, Torr. MS.) Very hairy; lower lip of the calyx 3-parted. — Found near San Francisco by several collectors, and perhaps a good species, though the only apparent characteristic is the remarkable division of the calyx.

Var. BICOLOR. (*L. bicolor*, Lindl.) The flowers a little larger, with somewhat broader petals, the pedicels 1 – 2″ long. Varying towards *L. nanus* and tending to unite the species.

† † Flowers scattered; bracts more or less persistent (except in Nos. 43, 47, and 48); ovules 4 – 6 (in *L. truncatus*, 8).

43. L. LEPTOPHYLLUS, Benth. Slender, 1 – 2° high, villous with both appressed and spreading rather rigid hairs; stipules linear-setaceous; leaflets 8 – 10, narrowly linear, 1 – 1½′ long, glabrous above, the very slender petioles 2 – 3 times longer; racemes becoming loose, 3 – 10′ long; bracts setaceous, much exceeding the calyx; pedicels 2 – 3″ long; upper calyx-lip narrow, deeply cleft; petals 5 – 6″ long, "bluish-lilac, with a deep-crimson spot on the banner"; pod narrow. — Hills and rocky places; Sacramento Valley and southward. A somewhat broader leaved form occurs.

44. L. SPARSIFLORUS, Benth. Very slender, 1 – 1½° high; villous with spreading hairs; upper leaves much reduced; leaflets 5 – 9, linear, ¼ – 1′ long, the very slender petioles 2 – 4 times longer; raceme 3 – 6′ long; bracts linear-setaceous, shorter than the calyx, subpersistent; pedicels 1 – 2″ long; upper calyx-lip 2-parted, lower entire; petals violet, 5″ long, the banner shorter; pod ½ – 1′ long. — Sacramento Valley to Southern California; spring.

45. L. TRUNCATUS, Nutt. Slender, 1 – 2° high, finely pubescent, becoming nearly glabrous; stipules short, subulate; leaflets 5 – 7, linear, attenuated from the truncate or sub-3-toothed apex to the base, ¾ – 1½′ long, smooth above, the petioles but little longer; raceme 3 – 6′ long; bracts short, linear-subulate, subpersistent; pedicels ½ – 2″ long; upper calyx-lip 2-cleft, the lower subentire; petals deep-purple, 4 – 5″ long, the banner shorter; pod 1¼′ long. — California, from San Francisco to San Diego; spring.

46. L. SUBCARNOSUS, Hook. Rather stout, 1° high, silky-pubescent; leaflets 5, cuneate-obovate, acute or rounded or retuse at the apex, ¾ – 1½′ long, usually glabrous above, the petioles 2 – 3 times longer; racemes 2 – 3′ long, elongating in fruit; bracts lanceolate, short, subpersistent; pedicels slender, 2 – 4″ long; upper calyx-lip 2-cleft, the lower subentire; petals blue, 4 – 5″ long, the banner with a white or yellow centre; pods 1½′ long, 4 – 6-seeded. — Texas; spring. Including *L. Texensis*, Hook. The typical form (142 Drummond) is the more densely pubescent state, the leaves not glabrous above and the flowers smaller.

47. L. Stiveri, Kellogg. Diffusely branched, ½ – 1° high, finely and rather sparingly pubescent; leaflets 5 – 7, broadly cuneate-obovate, ½ – 1½′ long, rounded or acutish at the apex, mucronulate, scarcely smoother above, the petioles but little longer; raceme 2 – 3′ long, 5 – 10-flowered, rather long-peduncled; bracts short, subulate; pedicels 1 – 2″ long; calyx silky-pubescent, minutely bracteolate, upper lip parted, the ovate acute lobes nearly equalling the broad entire lower lip; petals 6 – 7″ long, the yellow banner shorter than the rose-colored wings; pod slightly puberulent or glabrous, 1′ long. — In the Sierra Nevada, from Bear Valley to the Yosemite; a handsome and well-marked species.

48. L. hirsutissimus, Benth. Rather stout, 1° high or more, very hirsute with spreading, straight, and viscid "stinging" hairs; leaflets 5 – 7, broadly cuneate-obovate, rounded or retuse or sometimes acute at the apex, mucronulate, ¾ – 1½′ long, half as long as the petioles; racemes loose, 3 – 8′ long; bracts short, subulate, usually deciduous; pedicels 1 – 2″ long; calyx large, upper lip broad, deeply cleft, shorter than the lower; petals 6″ long, nearly equal, reddish-purple; pod hirsute, 1′ long. — Dry places from Sacramento Valley to Southern California; January to March. Specimens collected by Dr. Bigelow on Whipple's Exploration in Western Arizona, with shorter, less rigid, and more appressed hairs and acute linear-lanceolate leaves, may perhaps be referred here.

49. L. concinnus, Agh. Low, 4 – 6′ high, densely villous or hirsute, with long spreading hairs; leaflets 5 – 8, oblanceolate, 4 – 10″ long, obtuse, the slender petioles 2 – 4 times longer; raceme 1 – 2′ long, peduncled or nearly sessile; bracts short, linear-setaceous, persistent; pedicels very short; upper calyx-lip parted, the lower rather deeply trifid, narrow; petals 4″ long, "violet with a yellow spot on the banner," the banner shorter; pod 4-seeded. — From Monterey southward, Sonora and New Mexico; rarely collected.

Var. Arizonicus. Rather stout, ½ – 1° high, more sparingly hirsute with spreading hairs; leaflets cuneate-obovate, obtuse or acutish; raceme 2 – 6′ long; petals 3 – 4″ long, equal, ochroleucous or tipped with violet; pod ½′ long, 3 – 5-seeded. — Southeastern California and Western Arizona.

50. L. gracilis, Agh. Low, 3 – 6′ high, slender, very hirsute; leaflets 5 – 7, cuneate-obovate, 3 – 6″ long, the slender petioles 2 – 3 times longer; raceme short, loose, flexuous; bracts short; pedicels less

than 1″ long; petals "blue and white," 2 – 3″ long, narrow, the banner slightly shorter, the calyx and petals nearly as in *L. micranthus;* pod ½′ long, 4 – 5-seeded. — From Monterey to Southern California.

§ 2. PLATYCARPOS. Flowers as in § *Lupinus;* ovules 2; cotyledons broad and clasping after germination, usually long-persistent. — Annuals; leaflets several, cuneate-oblong or -obovate; bracts persistent; pods ovate.

* Flowers verticillate; stems tall; racemes long-peduncled.

51. L. MICROCARPUS, Sims. Villous with long spreading hairs, ½ – 1½° high; stipules long, setaceous; leaves mostly approximate upon the stem, on elongated petioles; leaflets 7 – 11, usually 9, cuneate-oblong, 1 – 2′ long, obtuse and mucronulate or emarginate, or sometimes acutish, smooth above; flowers in close verticils, on pedicels 1 – 2″ long; bracts subulate-setaceous, equalling the calyx or shorter; calyx densely villous, lower lip large, 3-toothed, the middle tooth small, the upper lip very short, subscarious, toothed; bractlets small, often wanting; petals purple, or sometimes flesh- or cream-colored or white, 6 – 7″ long, equal, the keel slightly ciliate; pods villous, 8″ long. — From the Columbia River to Southern California; stouter than most Chilian specimens. It occasionally approaches closely to the next in pubescence and in the color of the flowers.

52. L. DENSIFLORUS, Benth. Much resembling the last, but more sparingly villous with shorter hairs; bracts much shorter than the calyx, which is smooth or short-pubescent, the upper lip often entire; petals yellow, or ochroleucous, white or pink. — From the Sacramento Valley southward. It includes *L. Menziesii*, Agh.; and *L. succulentus*, Koch, is probably but a garden form.

53. L. BRIDGESII, Gray, MS. in herb. Stem 1 – 2° high, rather slender, branched; pubescence short, appressed, subsilky, the bracts and pod villous; stipules short; leaves scattered; petioles short; leaflets 5 – 9, usually 7, cuneate-oblong, 1′ long, obtuse or acute, pubescent both sides or sometimes smooth above; bracts linear-setaceous, exceeding the calyx; flowers as in the last, the petals pale-yellow, 6″ long. — Sacramento Valley. Collected by Bridges (55), Bolander (6512), and Dr. Kellogg.

* * Low; flowers scattered; bracts shorter than the calyx.

54. L. PUSILLUS, Pursh. Rather stout, 3 – 10′ high, diffusely branched, hirsute with long spreading hairs; leaflets usually 5, cuneate-

oblong or -oblanceolate, $\frac{3}{4} - 1\frac{1}{4}'$ long, acute or obtuse, nearly glabrous above, about half as long as the petioles; racemes short-peduncled or sessile, 2 – 3′ long; pedicels 2 – 3″ long; bractlets minute; upper calyx-lip 2-cleft, the lower subentire; petals purple or rose-color, 4″ long, equal; pods $\frac{1}{2} - \frac{3}{4}'$ long; seed nearly 2″ wide. — From the Missouri to the Columbia and southward, east of the Sierra, to New Mexico and Arizona.

55. L. BREVICAULIS, Watson. Less hairy; stems short or nearly wanting, 1 – 4′ high; leaflets mostly 7, cuneate-obovate, 5 – 8″ long, rounded at the apex; racemes dense, 1 – 2′ long, the peduncles nearly equalling the leaves; pedicels 1 – 2″ long in fruit; bractlets small; upper calyx-lip very short or truncate, scarious, the lower subentire; petals blue, 3 – 5″ long, equal; pod 3 – 5″ long; seed about 1″ broad. — From Northern Nevada to Arizona and Western New Mexico.

§ 3. LUPINELLUS. Flowers axillary, solitary; sides of the banner scarcely at all reflexed; keel nearly straight; pod ovate; ovules 2. — A dwarf diffusely branched villous annual.

56. L. UNCIALIS, Watson. Less than 1′ high, very leafy; leaflets 5, cuneate-oblong, 2″ long, obtuse, the petioles 2 – 3 times longer; stipules obtuse; peduncles axillary, equalling the leaves or shorter, the bract short and oval; calyx ebracteolate, upper lip short, deeply cleft, the lower 3-toothed, the middle tooth very small; petals ochroleucous, $1\frac{1}{2}''$ long, the banner shorter and obovate, acute, the keel tipped with purple, not beaked, obtuse; pod 2″ long, hairy. — Northwestern Nevada.

SYNONOMY,

WITH COLLECTORS' NAMES AND NUMBERS, SO FAR AS VERIFIED.

40. LUPINUS AFFINIS. Agardh, Synopsis Lup., 20, in part. Hook. & Arn., Bot. Beech., 335.* Torr. & Gray, Flora, 1. 376. Dietrich, Syn. Veg., 4. 940. Bolander, Cat. Pl. San Franc., 8. — Nos. 382, 387, 388, 389, 391 Coulter.

? *L. cervinus.* Kellogg, Proc. Acad. Calif., 2. 229, fig. 73.

16. LUPINUS ALBICAULIS. Douglas in Hook. Fl. Bor. Am., 1. 165. Don's Mill., 2. 366. Agardh, Syn., 29. Torr. & Gray, Flora, 1. 378. Dietr., Syn., 1. 942. Durand, Pl. Pratten., 86. Boland., Cat. Pl. San Franc., 8. — No. 58 Bridges; 84 Torrey; 89 Hall; Douglas; Nuttall; Wilkes; Bigelow; Pratten; Shelton.

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* References in *old style* numerals indicate only a mention of the species, without description or notes of special interest.

L. Mexicanus. Torrey in Sitgreave's Rep., 158; not Lag.

L. laxiflorus. Torrey, Pac. Railroad Rep., 4. 81; not Dougl.

L. foliosus. Nutt., MS. in herb. Gray in Proc. Amer. Acad., 8. 379.

Var. BRIDGESII. — Nos. 64, 64 a Bridges; 2644 Bolander; 857, 2540 Brewer.

4. LUPINUS ALBIFRONS. Bentham, Trans. Hort. Soc., n. s., 1. 410. Lindl., Bot. Reg., 19, t. 1642; (Lit. Ber. zu Linnæa, 1835, 30.) Agh., Syn., 33. Torr. & Gray, Flora, 1. 380. Hook. & Arn., Bot. Beech., 336. Dietr., Syn., 4. 942. Benth., Pl. Hartweg., 303. Torrey, Pac. R. R. Rep., 4. 81; Bot. Mex. Bound., 57. Newberry, Pac. R. R. Rep., 6. 70. Boland., Cat. Pl., 8. — No. 1688 Hartweg; 394 - 396 Coulter; 63 ("37") Bridges; "262 Lobb"; 112, 129, 262 Fremont; 507, 615 Thurber; 2365 Bolander; 570, 571, 644, 703, 1038 Brewer; 85 Torrey; 184 Kellogg & Harford; 93 Hall; Nuttall; Bigelow; Parry; Fitch; Peckham.

L. Chamissonis. Esch., Mem. Acad. Petr., 10. 288; (Lit. Ber. zu Linnæa, 1828, 151.) Presl., Repert. Bot., 1. 198. Hook. & Arn., Bot. Beech., 336.

L. sericeus. Hook. & Arn., Bot. Beech., 138; not Pursh.

L. ornatus. Torrey, Pac. R. R. Rep., 4. 81; not Dougl.

L. littoralis. Torrey, Bot. Mex. Bound., 58; not Dougl.

L. holosericeus. Gray, Proc. Amer. Acad., 8. 379; not Nuttall.

27. LUPINUS ANDERSONI. Watson, King's Rep., 5. 58. — Nos. 9, 108, 121 Anderson; Gray.

3. LUPINUS ARBOREUS. Sims, Bot. Mag., t. 682. Willd., Enum., 752. Persoon. Poiret. DC. Prodr., 2. 409. Sprengel, Syst. Veg. Don. Dietrich. Agardh, Syn., 25. Lindl., Bot. Reg., 24, t. 32. Benth., Pl. Hartw., 303. Torrey, Bot. Mex. Bound., 57. Boland., Cat., 8. — No. 1689 Hartweg; 380 Coulter; 61 Bridges; 402 Bolander; 641 Brewer; 86 Torrey; 182 Kell. & Harf.; Douglas; Wright; Parry; Gibbons; Shelton.

L. sericeus. Esch., Mem. Acad. Petr., 10. 289; not Pursh.

L. arboreus, var. *odoratissimus.* Fisch. & Mey., Ind. Sem. h. Petr., 2. 16.

L. rivularis. Agh., Syn., 24; not Dougl. Torr. & Gray, Flora, 1. 376, mostly. Hook. & Arn., Bot. Beech., 335. Dietr., Syn., 4. 941. Durand, Pl. Pratten., 86. Torrey, Bot. Mex. Bound., 57.

L. macrocarpus. Hook. & Arn., Bot. Beech., 138. Torr. & Gray, Flora, 1. 381. Dietr., Syn., 4. 943. Newberry, Pac. R. R. Rep., 6. 71.

14. LUPINUS ARCTICUS. — Richardson; Dean & Simpson; Lyall; Wood.

L. perennis. Richards., Frankl. 1st Voy., Appx. 17; not Linn. Hook., Fl. Bor. Am., 1. 163, in part. Hook. & Arn., Bot. Beech., 123. Ledebour, Fl. Ross., 1. 511. Seemann, Bot. Herald, 28 and 51. Hook. f., Distrib. Arc. Plants, 289. Rothrock, Fl. Alaska, 445.

31. LUPINUS ARGENTEUS. Pursh, Flora, 468. DC. Prodr., 2. 408. Sprengel, Syst., 3. 227. Hook., Fl. Bor. Am., 1. 164. Don's Mill., 2. 367. Torr. & Gray, Flora, 1. 377, in part. — Douglas; Nuttall; Tolmie; Burke; Newberry.

L. tenellus. Douglas, Don's Mill., 2. 367. Agh., Syn., 27.

L. laxiflorus, var. *tenellus.* Torr. & Gray, Flora, 1. 377. Porter, Hayden's Rep., 1871, 480.

L. laxiflorus, var. *foliosus.* Torr. & Gray, Flora, 1. 377.

L. ornatus. Newberry, Pac. R. R. Rep., 6 70; not Dougl.

Var. DECUMBENS. — Nos. 167, 168 Fendler; 29 Geyer; 200 Parry; 47 Anderson; 104 a Vasey; James; Fremont; Abert; Hulse; Palmer; Hayden; Canby.

L. decumbens. Torrey, Ann. N. Y. Lyc., 2. 191. Don's Mill., 2. 367. Torr. & Gray, Flora, 1. 381. Dietr., Syn., 4. 943. Gray, Pl. Fendl., 38. Engelm., Pl. Upp. Miss., 190. Porter, Hayden's Rep., 1870, 474.

L. laxiflorus. Hook., Pl. Geyer in Lond. Journ. Bot., 6. 215; not Dougl. Gray, Pl. Fendl., 38; Pl. Parry in Sill. Journ., 1862, 22.

L. ornatus. Torrey, Fremont's Rep., 89, mostly; not Dougl.

Var. ARGOPHYLLUS. — 166, 167 Fendler; Fremont; Bigelow.

L. decumbens, var. *argophyllus.* Gray, Pl. Fendl., 37. Torrey, Pac. R. R. Rep., 4. 81. Durand, Fl. Utah, 163?

L. ornatus. Torrey, Fremont's Rep., 89, in part; not Dougl.

35. LUPINUS ARIDUS. Dougl., Lindl. Bot. Reg., 15, **t. 1242.** Hook., Fl. Bor. Am., 1. 165. Don's Mill., 2. 367. Agh., Syn., 31. Torr. & Gray, Flora, 1. 379. Dietr., Syn., 4. 942. Boland., Cat., 8. — Douglas; Lyall.

Var. LOBBII. — "No. 264 Lobb"; 1894, 2085 Brewer.

Var. UTAHENSIS. — No. 234 Watson, in part.

L. aridus (?) Watson, King's Rep. 5. 57, in part.

18. LUPINUS BARBIGER. — Siler.

55. LUPINUS BREVICAULIS. Watson, King's Rep., 5. 53, **t. 7.** — No. 335 Thurber; 84 Anderson; 222, 223 Watson; Cooper; Palmer.

38. LUPINUS BREWERI. Gray, Proc. Amer. Acad., 6. 334. Watson, King's Rep., 5. 58. — No. 1634 Brewer; 20 Anderson; Gray.

53. LUPINUS BRIDGESII. Gray, MS. in herb. — No. 55 Bridges; 6512 Bolander; Kellogg.

10. LUPINUS BURKEI. — No. 46 Anderson; 36, 320 Stretch; 236 Watson; Burke; Hayden.

L. polyphyllus. Porter, Hayden's Rep., 1871, 480. Watson, King's Rep., 5. 55.

L. ——? Watson, King's Rep., 5. 58.

34. LUPINUS CÆSPITOSUS. Nuttall, Torr. & Gray's Flora, 1. 379. Dietrich, Syn., 4. 942. Gray, Proc. Acad. Phil., 1863, 59. Porter, Hayden's Rep., 1871, 480. — No. 253 Fremont; 96 Hall & Harb.; Nuttall; Parry.

29. LUPINUS CALCARATUS. Kellogg, Proc. Calif. Acad., 2. 195, **fig. 60.** Watson, King's Rep., 5. 56. — Nos. 30, 31, 92, 219 Anderson, and 233 in part; 266 Stretch; 1891 Brewer; 226 Watson; Beckwith; Bloomer.

L. decumbens, var. *argophyllus.* Torrey, Pac. R. R. Rep., 2. 121.

L. laxiflorus. Watson, King's Rep., 5. 55; not Dougl.

L. sulphureus. Watson, King's Rep., 5. 57; not Dougl.

49. LUPINUS CONCINNUS. Agardh, Syn. 6, **t. 1.** Hook. & Arn., Bot. Beech., 335. Torr. & Gray, Flora, 1. 372. Walpers, Repert., 1. 596. Dietrich, Syn., 4. 937. Torrey, Ives's Rep., 9. — No. 372 Coulter; Douglas; Smith; Hervey.

L. pusillus. Torrey, Bot. Mex. Bound., 57, in part.

Var. ARIZONICUS. — No. 287 a Schott; Fremont; Bigelow; Thomas; Palmer.

L. sparsiflorus. Torrey, Pac. R. R. Rep., 4. 81, in part; not Benth.

L. hirsutissimus. Torrey, Ives's Rep., 9; not Benth.

25. Lupinus confertus. Kellogg, Proc. Calif. Acad., 2. 192, fig. 59. — Nos. 1691 Brewer; 6286 Bolander; 45 Anderson; 82, 89 Torrey; Kellogg & Harford.

L. Torreyi. Gray, MS. in herb. Watson, King's Rep., 5. 58.

L. sellulus. Kellogg, Proc. Calif. Acad. 5. 36.

52. Lupinus densiflorus. Bentham, Hort. Trans., n. s., 1. 409. Lindl., Bot. Reg., t. 1689; (Lit. Ber. zu Linnæa, 1835, 56.) Torr. & Gray, Flora, 1. 371. Walpers, Repert., 1. 595. Dietrich, Syn., 4. 936 and 945. Torrey, Pac. R. R. Rep., 4. 81. Bolander, Cat., 8. — No. 381 Coulter; 147, 453, 473 Fremont; 59 Bridges; 959, 1039 Wilkes; 483 Brewer; 91 Torrey; 187 Kell. & Harf.; Bigelow; Peckham.

L. Menziesii. Agardh, Syn., 2. Hook. & Arn., Bot. Beech., 335. Torr. & Gray, Flora, 1. 371. Benth., Pl. Hartw., 303. Walpers, Repert., 1. 595. Hook., Bot. Mag., t. 5019. "Journ. d'Hort., 2, t. 3. Flor. des Serres, 14, t. 1458."

L. succulentus. Douglas; Koch in "Wochenschr. f. Gaertn., 4. 276"; Ind. Sem. h. Berl., 1867, Appx. 11.

L. Menziesii, var. *aurea.* Kellogg, Proc. Calif. Acad., 5. 16.

L. lacteus. Kellogg, Proc. Calif. Acad., 5. 37.

L. luteolus. Kellogg, Proc. Calif. Acad., 5. 38, mostly.

2. Lupinus diffusus. Nuttall, Genera, 2. 93. Elliot, Sketch, 2. 192. DC. Prodr., 2. 410. Don's Mill., 2. 369. Chapman, Flora, 89.

L. villosus, var. *diffusus.* Torr. & Gray, Flora, 1. 382.

5. Lupinus Douglasii. Agardh, Syn., 34. Hook. & Arn., Bot. Beech., 336. Torr. & Gray, Flora, 1. 380. Dietrich, Syn., 4. 943. Durand, Pl. Pratten., 86? — No. 384 Coulter; Douglas; Fremont; Wallace.

26. Lupinus flexuosus. Lindley; Agardh, Syn., 34. Torr. & Gray, Flora, 1. 381. Dietrich, Syn., 4. 943. Cooper, Pac. R. R. Rep., 12. 59. — Douglas; Wilkes; Spalding.

50. Lupinus gracilis. Agardh, Syn., 15, t. 1. Hook. & Arn., Bot. Beech., 335. Torr. & Gray, Flora, 1. 372. Walpers, Repert., 1. 598. Dietrich, Syn., 4. 936. — Douglas; Peckham; Willey.

48. Lupinus hirsutissimus. Bentham, Hort. Trans., n. s., 1. 409. Agardh, Syn., 4. Hook. & Arn., Bot. Beech., 335. Torr. & Gray, Flora, 1. 372. Walpers, Repert., 1. 595. Dietrich, Syn., 4. 936. Torrey, Pac. R. R. Rep., 7. 10; Bot. Mex. Bound., 57, in part; Bolander, Cat., 8. — No. 373 Coulter; 610 (or 510) Thurber; 316, 340 Brewer; Douglas; Bigelow.

L. sparsiflorus. Torrey, Pac. R. R. Rep., 4. 81, in part; not Benth.

32. Lupinus holosericeus. Nuttall; Torr. & Gray, Flora, 1. 380. Dietrich, Syn., 4. 943. — No. 232 Anderson; 88 Torrey; 229-232 Watson; 64 Eaton; Nuttall.

L. leucopsis. Watson, King's Rep., 5. 56.

L. flexuosus. Watson, l. c., 5. 55, in part; and var., l. c., 5. 56.

L. meionanthus, var. *heteranthus.* Watson, l. c., 5. 56.

Var. Utahensis. — No. 232 Watson; 64 Eaton; Stansbury.

L. albicaulis. Torrey, Stansbury's Rep., 386; not Dougl. Durand, Fl. Utah, 163.

L. leucopsis, var. Watson, King's Rep., 5. 56.

36. LUPINUS KINGII. — No. 234 Watson, in part.

L. aridus. Watson, King's Rep., 5. 57, in part.

30. LUPINUS LAXIFLORUS. Douglas; Lindl., Bot. Reg., 14, **t. 1140**. Hook., Fl. Bor. Am., 1. 164. Don's Mill., 2. 366. Agardh, Syn., 27. Torr. & Gray, Flora, 1. 377. Dietrich, Syn., 4. 941. Torrey, Pac. R. R. Rep., 2. 121? Cooper, Pac. R. R. Rep., 12. 59? Gray, Proc. Amer. Acad., 8. 379. — No. 106 Scouler; 423 Geyer; 227 Watson, and 228 in part; 90 Hall; Douglas; Fremont; Tolmie; Spalding; Kronkhite; Palmer; Wheeler.

L. arbustus. Douglas; Lindl., Bot. Reg., 15, **t. 1230**. Hook., Fl. Bor. Am., 1. 164. Don's Mill., 2. 368.

L. foliosus. Hook., Pl. Geyer, in Lond. Journ. Bot., 6. 215.

? *L. decumbens*. Torrey, Pac. R. R. Rep., 4. 81.

? *L. caudatus*. Kellogg, Proc. Calif. Acad., 2. 198, **fig. 61**.

L. argenteus. Watson, King's Rep., 5. 55; not Pursh.

L. flexuosus. Watson, l. c., 5. 55, in part.

24. LUPINUS LEPIDUS. Douglas; Lindl., Bot. Reg., 14, **t. 1149**. Hook., Fl. Bor. Am., 1. 163. Don's Mill., 2. 367. Agardh, Syn., 17. Lodd., Bot. Cab., **t. 1980**. Torr. & Gray, Flora, 1. 374. Dietrich, Syn., 4. 939. Newberry, Pac. R. R. Rep., 6. 71. Cooper, Pac. R. R. Rep., 12. 58. — No. 98 Douglas; 268 Stretch; 228 Watson, in part; Nuttall; Wilkes; Spalding; Newberry; Suckley; Bloomer.

L. concinnus. Durand, Pl. Pratten., 86; not Agardh.

L. flexuosus. Watson, King's Rep., 5. 55, in part.

43. LUPINUS LEPTOPHYLLUS. Bentham, Hort. Trans., n. s., 1. 409. Lindl., Bot. Reg., 20, **t. 1670**. Agardh, Syn., 11. Torr. & Gray, Flora, 1 .373. Hook. & Arn., Bot. Beech., 335. Walpers, Repert., 1. 597. Dietrich, Syn., 4. 938. Torrey, Pac. R. R. Rep., 4. 81. Gray, Proc. Bost. Nat. Hist. Soc., 1860, 1. — No. 370 Coulter; 58 ("39") Bridges; 23 Xantus; Douglas; Heermann; Bigelow; Stillmann.

22. LUPINUS LEUCOPHYLLUS. Douglas; Lindl., Bot. Reg., 13, **t. 1124**. Hook., Fl. Bor. Am., 1. 165. Don's Mill., 2. 367. Agardh, Syn., 31. Torr. & Gray, Flora, 1. 379. Torrey, Fremont's Rep., 89. Dietrich, Syn., 4. 942. Gray, Pl. Fendl., 38? Newberry, Pac. R. R. Rep., 6. 71. Cooper, Pac. R. R. Rep., 12. 52. Watson, King's Rep., 5. 57. Porter, Hayden's Rep., 1871, 480. Gray, Proc. Amer. Acad., 8. 379. — No. 737 Fremont; 390 Geyer, in part; 235 Watson; 67 Eaton; 87 Hall; 189 Kell. & Harf.; Douglas; Burke; Wilkes; Spalding; Lyall; Anderson.

L. plumosus. Douglas; Lindl., Bot. Reg., 15, **t. 1217**. Hook., Fl. Bor. Am., 1. 165. Don's Mill., 2. 367. Agardh, Syn., 32. Hook. & Arn., Bot. Beech., 336. Torr. & Gray, Flora, 1. 380. Dietrich, Syn., 4. 942.

L. albicaulis. Hook., Pl. Geyer in Lond. Journ. Bot., 6. 216, in part.

11. LUPINUS LITTORALIS. Douglas; Lindl., Bot. Reg., 14, **t. 1198**. Graham, Edinb. Phil. Journ., 1829, 185. Hook., Bot. Mag., **t. 2952**; Fl. Bor. Am., 1. 164. Don's Mill., 2. 367. Agardh, Syn., 36. Hook. & Arn., Bot. Beech., 335. Torr. & Gray, Flora, 1. 381. Dietrich, Syn., 4. 943. Cooper, Pac. R. R. Rep., 12. 58. Boland., Cat. 8. — No. 393 Coulter; 65 Bridges; Douglas; Cooper.

L. Nutkatensis, var. *fruticosus.* Sims, Bot. Mag., t. 2136.

L. versicolor. Lindl., Bot. Reg., 23, t. 1979; not Sweet. Torr. & Gray, Flora, 1. 376. Dietrich, Syn., 4. 940.

L. Nutkatensis, var. *glaber.* Hook., Fl. Bor. Am., 1. 163.

L. Nutkatensis. Cooper, Pac. R. R. Rep., 12. 58; not Donn.

39. Lupinus Lyallii. Gray, Proc. Amer. Acad., 6. 334. — Lyall.

Var. Danaus. — No. 5087 Bolander.

L. Danaus. Gray, Proc. Amer. Acad., 6. 335.

33. Lupinus meionanthus. Gray, Proc. Amer. Acad., 6. 522. Watson, King's Rep., 5. 56. — Nos. 2, 125 Anderson.

42. Lupinus micranthus. Dougl., Lindl. Bot. Reg., 15, t. 1251. Hook., Fl. Bor. Am., 1. 162. Don's Mill., 2. 366. Agh., Syn., 14. Torr. & Gray, Flora, 1. 373. Hook. & Arn., Bot. Beech., 335. Walpers, Repert., 2. 598. Dietr., Syn., 4. 938. Newberry, Pac. R. R. Rep., 6. 70. Cooper, Pac. R. R. Rep., 12. 58. Torrey, Bot. Mex. Bound., 57. Boland., Cat. 8. — No. 78 Fremont; 481, 601, 602 Thurber; 868, 982, 1149 Brewer; 84 Torrey; 180 Kell. & Harf., in part; 84 Hall; Douglas; Nuttall; Coulter; Wilkes; Parry; Wallace; Peckham.

L. nanus, var. Benth., Pl. Hartw., 303.

L. bicolor. Torrey, Bot. Mex. Bound., 57. Gray, Proc. Amer. Acad., 8. 379.

Var. bicolor. — No. 398 Coulter; 1691 Hartweg; 56 Bridges; 242 Fremont; 180 Kell. & Harf., in part; Douglas.

L. bicolor. Lindl., Bot. Reg., 13, t. 1109. Hook., Fl. Bor. Am., 1. 162. Don's Mill., 2. 366. Agardh, Syn., 14. Torr. & Gray, Flora, 1. 373. Hook. & Arn., Bot. Beech., 335. Walp. Rep., 2. 598. Dietr. Syn., 4.938. Torrey, Pac. R. R. Rep., 4. 81, in part. Newberry, Pac. R. R. Rep., 6.70.

L. gracilis. Durand & Hilgard, Pac. R. R. Rep., 5. 7, in part.

Var. microphyllus. — Nuttall; Heermann; Fitch.

L. microphyllus. Nutt., MS. in herb.

Var. trifidus. — No. 183 Kell. & Harf., in part; Bigelow; Fitch; Shelton.

L. bicolor. Torrey, Pac. R. R. Rep., 4. 81, in part.

L. trifidus. Torrey, MS. in herb.

51. Lupinus microcarpus. Sims, Bot. Mag., t. 2413. DC. Prodr., 2. 408. Don's Mill., 2. 366. Agardh, Syn., 2. Hook. & Arn., Bot. Beech. 21 and 335. Torr. & Gray, Flora, 1. 371. Walpers, Repert., 1. 595. Dietrich, Syn., 4. 936. Gray, Proc. Bost. Nat. Hist. Soc., 1860, 1. — No. 1692 Hartweg; 60 Bridges; 579 Thurber; 21 Xantus; 959, 1039 Wilkes, in part; 100 Bolander; 185 Kell. & Harf.; Brewer; Peckham.

L. densiflorus. Agardh, Syn., 3; not Benth., in Hort. Trans. Benth., Pl. Hartw., 303. Hook. & Arn., Bot. Beech., 335.

L. palustris. Kellogg, Proc. Calif. Acad., 5. 16.

L. Menziesii. Torrey, Bot. Mex. Bound., 57.

37. Lupinus minimus. Douglas; Hook., Fl. Bor. Am., 1. 163. Agardh, Syn., 16. Don's Mill., 2. 367, and 476. Torr. & Gray, Flora, 1. 374. Dietrich, Syn., 4. 939. Gray, Proc. Amer. Acad., 6. 335; 8. 379. — No. 1065 Wilkes; 92 Hall; Douglas; Lyall.

41. LUPINUS NANUS. Douglas; Bentham, Hort. Trans., n. s., 1. 409, t. **14**. Don, Sweet's Brit. Fl. Gard., 2 ser., t. **257**. Agardh, Syn., 11. Lindl., Bot. Reg., 20 t. **1705**. Hook. & Arn., Bot. Beech., 335. Torr. & Gray, Flora, 1. 373. Walpers, Repert., 1. 597. Dietrich, Syn., 4. 938. Benth., Pl. Hartw., 303. Durand, Pl. Pratten., 86. Torrey, Pac. R. R. Rep., 4. 81. Newberry, Pac. R. R. Rep., 6. 70. Bolander, Cat., 8. — Nos. 386, 388 Coulter; 1690 Hartweg; 57, 57 a, 58 b, 66 Bridges; 22 Xantus; 379, 451 Brewer; 87 Torrey; 181 Kell. & Harf., and 183 in part; Douglas; Nuttall; Newberry; Bigelow; Gibbons; Fitch.

L. affinis. Agardh, Syn., 20, in part. Torrey, Bot. Mex. Bound., 57, in part.

L. nanus, var. *latifolius.* Benth., Pl. Hartw., 303. Torrey, Pac. R. R. Rep., 4. 81.

L. sparsiflorus. Torrey, Pac. R. R. Rep., 5. 360. Gray, Ives's Rep., 9.

L. bicolor. Gray, Proc. Bost. Nat. Hist. Soc., **7. 146**.

6. LUPINUS NOOTKATENSIS. Donn, "Cat. Cant." Sims, Bot. Mag., t. **1311**. Aiton, Hort. Kew., 2 ed., 4. 286. Pursh, Flora, 467. Lodd., Bot. Cab., t. **879**. DC. Prodr., 2. 408. Hook., Fl. Bor. Am., 1. 163, excl. var. Agardh, Syn., 21. Don's Mill., 2. 366. Hook. & Arn., Bot. Beech., 335. Torr. & Gray, Flora, 1. 375. Ledeb., Fl. Ross., 1. 512. Dietrich, Syn., 4. 940. Regel, "Ind. Sem. h. Petr. 1857"; Müller, Annal., 7. 674. Rothrock, Fl. Alaska, 445. — Eschscholtz; Burke; Harrington; Elliot.

L. variegatus. Poiret, Suppl., 3. 520.

L. Nutkanus. Sprengel, Syst., 3. 227.

L. macrorrhizos. Georgi, "Beschr. Ross., 4. 1162."

L. Blaschkeanus. Fisch. & Mey., Ind. Sem. h. Petr., 1846, Suppl., 57.

Var. UNALASKENSIS. — Eschscholtz; Rudolphi; Barclay; Harrington.

L. Regius. Rudolphi.

13. LUPINUS NUTTALLII.

L. gracilis. Nuttall, Journ. Phil. Acad., 7. 115; not Agardh.

L. perennis, var. Torr. & Gray, Flora, 1. 376. Chapman, Flora, 89.

19. LUPINUS ORNATUS. Douglas; Lindl., Bot. Reg., 14. t. **1216**. Hook., Fl. Bor. Am., 1. 164. Don's Mill., 2. 367. Sweet, Brit. Fl. Gard., 2 ser., t. **212**. Agardh, Syn., 28. Torr. & Gray, Flora, 1. 378. Dietrich, Syn., 4. 942. Torrey, Pac. R. R. Rep., 7. 10; Bot. Mex. Bound., 57. Boland., Cat., 8. Gray, Proc. Amer. Acad., 8. 379. — Nos. 1387, 2180 Brewer; 88 Hall; Douglas; Wilkes; Bigelow; Parry; Stillman; Sprague; Howard; Gray.

L. leucopsis. Agardh, Syn., 29. Torr. & Gray, Flora, 1. 378. Dietr., Syn., 4. 942.

L. argenteus. Agardh, Syn., 27; not Pursh. Torr. & Gray, Flora, 1. 377, in part. Dietrich, Syn., 4. 942.

L. rivularis. Torrey, Pac. R. R. Rep., 4. 81; not Dougl.

L. sericeus. Cooper, Pac. R. R. Rep., 12. 52; not Pursh.

L. Douglasii. Torrey, Bot. Mex. Bound., 57; not Agardh.

Var. GLABRATUS. — No. 578 Fremont; 95 Hall & Harb.; 104 Vasey; Gordon; Greene.

L. ornatus. Torrey, Fremont's Rep., 89, in part. Gray, Proc. Phil. Acad., 1863, 59. Engelm., Pl. Upp. Miss., 190. Porter, Hayden's Rep., 1870, 474; 1871, 480.

23. Lupinus Palmeri. — Palmer.

28. Lupinus parviflorus. Nuttall; Hook. & Arn., Bot. Beech., 336. Torr. & Gray, Flora, 1. 375. Dietrich, Syn., 4. 939. Porter, Hayden's Rep., 1870, 474. Watson, King's Rep., 5. 54. Gray, Proc. Amer. Acad., 8. 379. — No. 413 Fremont; 225 Watson; 65 Eaton; 91 Hall; Nuttall; Tolmie; Gray.

12. Lupinus perennis. Linn., Spec., 721. Desrous., Lam. Dict., 3. 621; Ill., **t. 616**. Aiton, Hort. Kew., 2.28. Sims, Bot. Mag., **t. 202**. Michaux, Flora, 2. 55. Persoon, 2. 293. Pursh, Flora, 467. Barton, "Flora, 2. **t. 38**." Elliott, Sketch, 2. 19. DC. Prodr., 2. 408. Hook., Fl. Bor. Am., 1. 163, in part. Darlington, Fl. Cestr., 431. Torr. & Gray, Flora, 1. 376, in part. Parry, Cat. Pl. Wisc., 611. Engelm., Pl. Upp. Miss., 190. Cooper, Pac. R. R. Rep., 12. 42. Chapman, Flora, 89. Gray, Manual, 126.

7. Lupinus polyphyllus. Lindl., Bot. Reg., 13. **t. 1096**, and 16. **t. 1377**. Hook., Fl. Bor. Am., 1. 164. Agardh, Syn., 17. Don's Mill., 2. 366. Hook. & Arn., Bot. Beech., 138. Torr. & Gray, Flora, 1. 375. Dietrich, Syn., 4. 939. Hook., Pl. Geyer in Lond. Journ. Bot., 6. 216. "Reichenb., Exot., **t. 176**." Newberry, Pac. R. R. Rep., 6. 70. Cooper, Pac. R. R. Rep., 12. 58. Regel, Ind. Sem. h. Petr., 1866, 108. Bolander, Cat., 8. Gray, Proc. Amer. Acad., 8. 379. — No. 105 Scouler; 6507 Bolander; 85 Hall; Nuttall; Lyall; Shelton; Cronkhite; Williamson.

L. grandiflorus. Lindl.; Agardh, Syn., 18. Hook. & Arn., Bot. Beech., 335.

L. macrophyllus. Bentham; Don, Sweet's Brit. Fl. Gard., 2 ser., **t. 356**, and Addenda.

54. Lupinus pusillus. Pursh, Flora, 468. Nuttall, Gen., 2. 93. DC. Prodr., 2. 408. Torrey, Ann. N. Y. Lyc., 2. 191. Hook., Fl. Bor. Am., 1. 162. Agardh, Syn., 15. Torr. & Gray, Flora, 1. 374. Torrey, Nicollet's Rep., 149. Hook., Pl. Geyer in Lond. Journ. Bot., 6. 216. Gray, Pl. Wright., 2. 49; Pl. Thurb., 300; Ives's Rep., 9. Torrey, Sitgreave's Rep., 158; Bot. Mex. Bound., 57, in part. Cooper, Pac. R. R. Rep., 12. 42. Engelm., Pl. Upp. Miss., 190. Gray, Proc. Phil. Acad., 1863, 59. Porter, Hayden's Rep., 1870, 474; 1871, 480. Watson, King's Rep., 5. 53. — No. 161 Nicollet; 103, 296 Fremont; 959, 1039 Wilkes, in part; 31, 287 Parry; 94 Hall & Harb.; 221 Watson; 103 Vasey; 103 Greene; 88 Culbertson; James; Nuttall; Burke; Woodhouse; Newberry; Stevens; Engelmann; Anderson.

9. Lupinus rivularis. Douglas; Lindl., Bot. Reg., 19. **t. 1595**; (Litt. Ber. zu Linnæa, 1835, 16.) — No. 383 Coulter; 62 Bridges; 14 Gibbons; 83, 83 a Torrey; 86 Hall; 186, 188 Kell. & Harf.; Douglas; Bigelow; Parry; Samuels.

L. lucidus. Hort. Soc.

L. latifolius? Gray, Proc. Amer. Acad., 8. 379.

Var. latifolius. — No. 622 Thurber; 284, 392, 637, 869, 996 Brewer; Douglas; Bigelow.

L. latifolius. Agardh, Syn., 18. Lindl., Bot. Reg., 22. **t. 1891**. Torr. & Gray, Flora, 1. 375. Hook. & Arn., Bot. Beech., 335. Dietrich, Syn.,

4. 939. Durand, Pl. Pratten., 86? Torrey, Pac. R. R. Rep., 4. 81. Newberry, Pac. R. R. Rep., 6. 70? Bolander, Cat., 8.

L. cytisoides. Torrey, Bot. Mex. Bound., 57, in part.

15. Lupinus Sabinii. Douglas; Hook., Fl. Bor. Am., 1. 166. Torr. & Gray Flora, 1. 378. Dietrich, Syn., 4. 942. — Douglas; Bigelow ?

L. Sabinianus. Douglas; Lindl., Bot. Reg., 17. t. **1435**. Don's Mill., 2. 367. Agardh, Syn., 30.

? *L. macrocarpus.* Torrey, Pac. R. R. Rep., 4. 81.

21. Lupinus sericeus. Pursh, Flora, 468. DC. Prodr., 2. 408. Hook., Fl. Bor. Am., 1. 164. Don's Mill., 2. 367. Agardh, Syn., 31. Torr. & Gray, Flora, 1. 379, in part. Hook. & Arn., Bot. Beech., 336. Benth., Bot. Sulph., 11. Dietrich, Syn., 4. 942. Watson, King's Rep., 5. 57. — No. 390 Geyer, in part; 233 Watson, and 228, in part; 66 Eaton; Wyeth; Beckwith; Mullan.

L. ornatus. Nuttall, Proc. Phil. Acad., 1822, 7.

L. affinis. Torr. & Gray, Pac. R. R. Rep., 2. 121.

L. albicaulis. Hook., Pl. Geyer in Lond. Journ. Bot., 6. 216, in part.

L. flexuosus. Watson, King's Rep., 5. 55, in part.

17. Lupinus Sitgreavii. — Sitgreave; 2012 Brewer; 1020 Wright; Wheeler.

L. Mexicanus. Torr., Bot. Mex. Bound., 57. Gray, Pl. Wright., 2. 49, in part.

? *L. Mexicanus.* Gray, Pl. Wright., 2. 49, in part.

44. Lupinus sparsiflorus. Bentham, Pl. Hartw., 303. Walpers, Annal., 2. 319. Torrey, Bot. Mex. Bound., 57. — No. 595 Thurber; Coulter; Heermann; Wallace; Peckham.

L. gracilis. Dur. & Hilg., Pac. R. R. Rep., 5. 7, in part.

47. Lupinus Stiveri. Kellogg, Proc. Calif. Acad., 2. 192, fig. **58**. — Nos. 45, 55 a Bridges; 90 Torrey; Stillman; Bolander; Goodale; Kellogg; Gray; Dix.

46. Lupinus subcarnosus. Hook., Bot. Mag., t. **3467**. Torr. & Gray, Flora, 1. 372. Walpers, Repert., 1. 596. Dietrich, Syn., 4. 937. Scheele, Roemer's Texas, 428. Gray, Pl. Wright., 1.54. Torrey, Bot. Mex. Bound., 57.

L. bimaculatus. Hooker; Don, Sweet's Brit. Fl. Gard., 2 ser., t. **314**; not Lam. Walpers, Repert., 1. 596.

L. Texensis. Hook., Bot. Mag., t. **3492**. Torr. & Gray, Flora, 1. 372. Walpers, Repert., 1.596. Dietrich, Syn., 4. 937. Gray, Pl. Lindh., 34 and 177. Scheele, Roemer's Texas, 428.

20. Lupinus sulphureus. Douglas; Hook., Fl. Bor. Am., 1. 166. Don's Mill., 2. 367. Agardh, Syn., 30. Torr. & Gray, Flora, 1. 378. Dietrich, Syn., 4. 942. — Douglas; Spalding ?; Wyeth ?

? *L. sericeus.* Torr. & Gray, Flora, 1. 379, in part.

45. Lupinus truncatus. Nuttall; Hook. & Arn., Bot. Beech., 336. Torr. & Gray, Flora, 1. 373. Walpers, Repert., 1. 597. Dietrich, Syn., 4. 938. Torrey, Bot. Mex. Bound., 57. Bolander, Cat., 8. — Nos. 369, 378, 397 Coulter; 539 Thurber: 345, 385 Brewer; Douglas; Nuttall; Wallace; Parry.

56. Lupinus uncialis. Watson, King's Rep., 5. 54, t. **7**. — No. 224 Watson.

1. Lupinus villosus. Willd., Spec., 3. 1029. Persoon, Ench., 2. 294. Aiton,

Hort. Kew., 2 ed., 4. 287. Poir., Suppl., 3. 519. Pursh, Flora, 468, **t. 21.** Nuttall, Gen., 2. 93. Elliott, Sketch, 2. 191. DC. Prodr., 2. 410. Agardh, Syn., 41. Torr. & Gray, Flora, 1. 382. Chapman, Flora, 89.

L. pilosus. Walter, Fl. Car., 180; not Linn. Michaux, Flora, 2. 56.

L. integrifolius. Desrous., Lam. Dict., 3. 627; not Linn.

8. LUPINUS WYETHII. — Wyeth; Spalding.

L. sericeus. Nuttall, Journ. Acad. Phil., 7. 79; not Pursh.

Cross-References.

L. affinis; L. nanus; L. sericeus.

L. albicaulis; L. holosericeus, var.; L. leucophyllus; L. sericeus.

L. argenteus; L. laxiflorus; L. ornatus.

L. arbustus = L. laxiflorus.

L. aridus; L. Kingii.

L. bicolor; L. micranthus; L. nanus.

L. bimaculatus = L. subcarnosus.

L. Blaschkeanus = L. Nootkatensis.

L. caudatus = L. laxiflorus.

L. cervinus = L. affinis.

L. Chamissonis = L. albifrons.

L. concinnus; L. lepidus.

L. cytisoides = L. rivularis.

L. Danaus = L. Lyallii, var.

L. decumbens; L. argenteus; L. calcaratus; L. laxiflorus.

L. densiflorus = L. microcarpus.

L. Douglasii = L. ornatus.

L. flexuosus; L. holosericeus; L. laxiflorus; L. lepidus; L. sericeus.

L. foliosus; L. albicaulis; L. laxiflorus.

L. gracilis; L micranthus; L. sparsiflorus; L. Nuttallii.

L. grandifolius = L. polyphyllus.

L. hirsutissimus; L. concinnus.

L. holosericeus; L. albifrons.

L. lacteus = L. densiflorus.

L. integrifolius = L. villosus.

L. latifolius = L. rivularis.

L. laxiflorus; L. albicaulis; L. argenteus; L. calcaratus.

L. leucopsis; L. holosericeus; L. ornatus.

L. littoralis; L. albifrons.

L. luteolus = L. densiflorus ?

L. lucidus = L. rivularis.

L. macrocarpus; L. arboreus; L. Sabinii.

L. macrophyllus = L. polyphyllus.

L. macrorrhizos = L. Nootkatensis.

L. meionanthus; L. holosericeus.

L. Mexicanus; L. albicaulis; L. Sitgreavii.

L. Menziesii; L. densiflorus; L. microcarpus.

L. microphyllus = L. micranthus.

L. nanus; L. micranthus.

L. Nootkatensis; L. littoralis.

L. ornatus; L. albifrons; L. argenteus; L. sericeus.

L. palustris = L. microcarpus.

L. perennis; L. arcticus; L. Nuttallii.

L. pilosus = L. villosus.

L. plumosus = L. leucophyllus.

L. polyphyllus; L. Burkei.

L. pusillus; L. concinnus.

L. regius = L. Nootkatensis.

L. rivularis; L. arboreus; L. ornatus.

L. sellulus = L. confertus.

L. sericeus; L. albifrons; L. arboreus; L. ornatus; L. sulphureus; L. Wyethii.

L. sparsiflorus; L. concinnus; L. hirsutissimus; L. nanus.

L. succulentus = L. densiflorus.

L. sulphureus; L. calcaratus.

L. tenellus = L. argenteus.

L. Texensis = L. subcarnosus.

L. trifidus = L. micranthus, var.

L. variegatus = L. Nootkatensis.

L. versicolor = L. littoralis.

L. villosus; L. diffusus.

Revision of the extra-tropical North American Species of the Genus Potentilla (excluding Sibbaldia, Horkelia, *and* Ivesia*).* — By Sereno Watson.

The materials for this and the following revisions were the same as for the last, namely, the collections belonging to Harvard and Columbia Colleges, to the Philadelphia Academy, and to Professor Eaton. The number of species has been considerably reduced, owing to a better knowledge of some of the obscurer species, and especially to the less weight which has been given to the distinction between pinnate and digitate leaves and the number of leaflets, to differences in the amount of pubescence, and in some species to the number of stamens.

The genera *Sibbaldia*, *Horkelia*, and *Ivesia*, distinguished by minor but apparently sufficient characters, are not included. The synonomy, etc., of the common eastern species is limited mainly to references respecting their more western or northern range.

Synopsis of Species.

I. Styles fusiform; carpels numerous, glabrous; inflorescence terminal.

* Style attached near the base of the ovary; disk thickened; stamens 25 – 30; perennial herbs with glandular-villous pubescence, pinnate leaves, and rather large white or yellow flowers.

Stout; cyme strict and rather close; leaflets 7 – 11; stamens mostly 30 . . . . 1. *P. arguta.*

Slender; cyme loosely panicled; leaflets 5 – 9; stamens mostly 25 . . . . 2. *P. glandulosa.*

* * Style terminal; disk not thickened; flowers small, yellow; leaves pinnate or ternate.

† Annual or biennial; leaflets incisely serrate, not white-tomentose; stamens 5 – 20

Stout, erect, hirsute; cyme rather close, leafy; leaves ternate; calyx large; stamens 15, rarely 20 . . 3. *P. Norvegica.*

More slender and branched, softly villous; cyme loose, often diffuse, less leafy; leaflets pinnately 5 or 3; calyx small; petals minute; stamens 10 – 20 (rarely 5) . . . . 4. *P. rivalis.*

Subdecumbent, subvillous; cyme loose, leafy; leaflets pinnately 5 – 11; stamens 20; achenia strongly gibbous on the ventral side . . . . . 5. *P. supina.*

† † Herbaceous perennials, more or less white-tomentose; leaflets incisely pinnatifid; bractlets and sepals nearly equal; stamens 20 – 25.

Leaflets 5 – 9; cyme fastigiate; stamens 25, sometimes 20 . . . . 6. *P. Pennsylvanica.*

Leaflets 3; cyme close; stamens 20; low . . . 7. *P. Hookeriana.*

Leaflets 3 – 5; flowers 1 – 3, on slender pedicels; stamens 20; low, arctic . . . . . . 8. *P. pulchella.*

II. Styles filiform; inflorescence terminal.

* Style terminal (nearly so in *P. brevifolia*); carpels glabrous; disk not thickened; stamens 20; herbaceous perennials, with rather large yellow flowers.

† Leaves pinnate (sometimes digitate in Nos. 9 and 14); carpels 10 – 40; bractlets shorter than the sepals.

Leaflets 5 – 11, white-tomentose, at least beneath, diminishing uniformly down the petiole; carpels 10 – 30 . . . . 9. *P. Hippiana.*

Leaflets 5 – 11, white-tomentose, the alternate ones smaller; carpels 10 . . . . 10. *P. effusa.*

Appressed silky-villous; stems decumbent; leaflets 9 – 15, folded, falcate; carpels 25 – 30 . . . 11. *P. crinita.*

Low, alpine or subalpine; flowers few.

White-tomentose; leaflets 7 – 13, broadly cuneate; flowers rather large in a close cyme . . . 12. *P. Breweri.*

Silky-villous or subglabrous; leaflets 7 – 13, small, broadly cuneate; flowers small, in an open cyme . 13. *P. Plattensis.*

Subglabrous or silky-villous; leaflets 5 – 7, rarely 3, often digitate . . . . 14. *P. dissecta.*

† † Leaves digitately 5 – 7-foliolate (rarely pinnate in *P. gracilis*); tomentose or villous.

Leaflets 5 – 7, rarely 3; bractlets shorter than the sepals; carpels more than 40; Western . . 15. *P. gracilis.*

Leaflets 5, white-tomentose beneath, smooth above; bractlets and sepals equal; carpels more than 40; Eastern . . . . 16. *P. argentea.*

Leaflets 5, toothed only at the apex, tomentose and villous; stems decumbent; carpels 15 – 20 . 17. *P. humifusa.*

† † † Leaves ternate (quinate in *P. maculata*); low, arctic or alpine, few-flowered; carpels 15 – 40.

Tomentose and villous; bractlets acute . . 18. *P. nivea.*

Villous or densely tomentose; bractlets obtuse; Alaska . . . . 19. *P. fragiformis.*

Sparingly villous or subglabrous.

Leaflets 5, rarely 3; bractlets shorter than the sepals; Labrador and Greenland . . . 20. *P. maculata.*

Flowers mostly solitary; bractlets and sepals equal, obtuse . . . . 21. *P. emarginata.*

Nearly glabrous; flowers 1 – 3; bractlets and sepals nearly equal; Oregon . . . . 22. *P. gelida.*

Flowers 3 – 6; bractlets much shorter; Western 23. *P. Grayi.*
Flowers solitary; bractlets and sepals equal, obtuse; very dwarf, villous; White Mts. . . 24. *P. frigida.*
Leaflets roundish, 2 – 3-lobed and crenate; glandular-puberulent; Rocky Mts. . . . 25. *P. brevifolia.*

* * Style terminal or medial; carpels glabrous; disk thickened or glandular; stamens 20; smooth or smoothish herbaceous perennials, with large purple or yellow flowers.

Style attached to the middle of the ovary; flowers purple; leaves pinnately 5 – 7-foliolate . . 26. *P. palustris.*
Style terminal; flowers purple; leaves digitately 5 – 7-foliolate; New Mexico . . . . 27. *P. Thurberi.*
Style attached below the apex; flowers yellow; leaflets 3, 2 – 3-parted; arctic, dwarf . . . . 28. *P. biflora.*

* * * Style attached below the middle; carpels and receptacle densely villous; woody perennials.

Shrubby, erect, much branched; leaves pinnate; leaflets 5 – 7, entire . . . . 29. *P. fruticosa.*
Woody only at base, low; leaflets 3, toothed at the apex; flowers white . . . . . . 30. *P. tridentata.*

III. Styles filiform; peduncles axillary, solitary, 1-flowered; carpels glabrous; stems creeping or decumbent; herbaceous perennials.

Style attached to the middle of the ovary; leaves pinnately 7 – 21-foliolate . . . . 31. *P. Anserina.*
Style attached below the apex; leaves apparently quinate . . . . 32. *P. Canadensis.*
Style attached below the apex; leaves ternate or quinate; sepals and petals usually 4 . . . . . . 33. *P. nemoralis.*

I. Styles thickened and glandular toward the base; carpels glabrous, numerous, sessile; inflorescence cymose. — Spec. 1 – 8.

* Style attached below the middle of the ovary; disk thickened and pentagonal; stamens 25 – 30, rarely twenty, in one row on the margin of the disk; herbaceous perennials, with pinnate leaves; pubescence glandular-villous.

1. P. ARGUTA, Pursh. Stems erect, usually stout, 1 – 4^a high, simple below; pubescence spreading; stipules ovate, acute, entire or incised; radical leaves 7 – 11-foliolate, 4–12′ long, usually long-petioled; leaflets rounded, ovate, or subrhomboidal, incised or doubly serrate, smoother on the upper surface, the terminal one 1 – 3′ long; cyme usually crowded, with strict pedicels becoming rigid; calyx densely pubescent, the acute sepals 3 – 4″ (becoming 5″) long, bractlets much

smaller; petals suborbicular, 3 – 4″ long, white, yellowish, or in some western specimens bright yellow; stamens mostly 30, with dark thickened anthers. — From New England to the Saskatchewan, and in the Rocky Mts. from Northern Idaho to New Mexico.

2. P. GLANDULOSA, Lindl. (*P. fissa*, Nutt.; *P. Wrangeliana*, Fisch. & Mey.) Resembling the last, but usually more slender and branched, 1 – 2° high, and for the most part less pubescent; leaflets more frequently 5 – 9, usually 1′ long or less; cyme panicled, with elongated branches and more slender pedicels; flowers often smaller; calyx much less tomentose, becoming less rigid; bractlets linear; petals yellow, sometimes white; stamens usually 25. — Washington Territory to California, and eastward to the mountains of Colorado and New Mexico. A very slender form with but few small flowers and sometimes but 20 stamens, the cyme often close, is found in the Sierra Nevada and in Colorado.

* * Style terminal; disk not thickened; flowers small, yellow; leaves pinnate or ternate.

† Annual or biennial; leaflets incisely serrate, not white-tomentose; stamens 5 – 20.

3. P. NORVEGICA, L. Erect, stout, ½ – 2° high, leafy, at length dichotomous above, hirsute; stipules large, ovate, coarsely incised or entire; leaves ternate, mostly short-petioled; leaflets obovate or oblong-lanceolate, 1 – 3′ long; cyme leafy and rather loose; calyx large, becoming 3 – 5″ long, the bractlets nearly equalling or exceeding the sepals; petals shorter, obovate, emarginate; stamens 15, in two rows, rarely 20; achenia rugose or nearly smooth; receptacle large, oblong. — From Labrador and the Northern States to Washington Territory, Alaska, and Pt. Barrow, and in the Rocky Mts. southward to New Mexico; sparingly introduced in the Southern States. *P. Labradorica*, Lehm., is but an unusually smooth form.

4. P. RIVALIS, Nutt. More slender, usually diffusely branched, even from the base; pubescence softly villous, spreading, sometimes nearly wanting; stipules lanceolate to ovate, entire or toothed; leaves pinnate, with two pairs of closely approximate leaflets, or a single pair and the terminal leaflet 3-parted, the upper leaves ternate; leaflets ovate or oblong-cuneate or lanceolate, 1 – 1½′ long, more or less incised-serrate; cymes loose, less leafy, with slender pedicels; bractlets and sepals equal, 1½ – 3″ long; petals minute; stamens 10 – 20; achenia

usually smooth; receptacle short. — From the Missouri River to New Mexico, and westward to Southern California and the valley of the Columbia. A rather variable species. The stamens opposite to the petals and to the midvein of the sepals are often wanting wholly or in part. The ovules are amphitropous or nearly orthotropous.

Var. MILLEGRANA. (*P. millegrana*, Engelm.) Leaves all ternate; stems erect, or weak and ascending; achenia often small and light-colored.

Var. PENTANDRA. (*P. pentandra*, Engelm.) Leaves ternate, the lateral leaflets of the lower leaves parted nearly to the base; stamens 5, opposite to the sepals. — Dr. Engelmann collected specimens of this in 1835 near Ft. Gibson, Arkansas. It has not been found since, and seems to be but a form of *P. rivalis*, the usual outer circle of 10 stamens (in pairs opposite to the sepals) being suppressed.

5. P. SUPINA, L. (*P. paradoxa*, Nutt.) Stems decumbent at base or erect, often stout, leafy, the rootstock apparently sometimes perennial; pubescence scanty, villous, spreading; stipules ovate, mostly entire; leaflets 5 – 11, obovate or oblong, ½ – ¾′ long; cymes loose, leafy; bractlets and sepals nearly equal; petals obovate, 2″ long, equalling the calyx; stamens 20; receptacle thick; achenia strongly gibbous by the thickening of the very short pedicel. — From the Lakes to the Saskatchewan and "Oregon" (Nuttall), and southward from the Missouri to New Mexico. The gibbosity of the achenium, scarcely observable in the European form, and the only distinguishing mark of *P. paradoxa*, is found fully as decided in specimens from Siberia, China, and the Himalaya.

Var. NICOLLETII. Slender and seemingly decumbent; leaflets mostly but three; inflorescence much elongated, leafy, and falsely racemose. — Collected by Nicollet at Devil's Lake, Minnesota.

† † Herbaceous perennials, more or less white-tomentose; leaflets incisely pinnatifid; bractlets and sepals nearly equal; stamens 20 – 25.

6. P. PENNSYLVANICA, L. Silky-tomentose; stems erect or decumbent at base, ½ – 2° high; stipules incised; leaflets 5 – 9, white-tomentose beneath, short-pubescent and greener above, oblong, obtuse, often approximate, the linear segments obtuse or acute, slightly or not at all revolute; cyme fastigiate but rather open, the pedicels erect; bractlets as long as the sepals or longer, sometimes a little shorter, obtuse or

acute; petals suborbicular, emarginate, 2″ long, about equalling the calyx; stamens usually 25; carpels numerous. — With scarcely a doubt to be referred to *P. sericea.* The species are kept distinct by all Russian botanists, though Regel & Herder state that the only apparent distinction is in the larger flowers of *P. sericea,* and that this is probably but the large-flowered alpine form of *P. Pennsylvanica.* — Found on the coast of Maine and New Hampshire, and in British America from Canada to the Rocky Mts., and rather common southward in the mountains to Colorado and New Mexico. It is occasionally somewhat resinous, especially upon the calyx, and sometimes the achenia.

Var. STRIGOSA, Lehm. Stems 6 – 12′ high; silky-tomentose throughout, the upper surface of the leaves scarcely less so; leaflets deeply pinnatifid, margins of the narrow lobes revolute; cyme short and close. — From Wisconsin and the Saskatchewan to Kansas, and in the mountains to New Mexico. The var. *bipinnatifida,* Torr. & Gray, is merely a form with the elongated linear segments usually more spreading.

Var. GLABRATA. (*P. sericea,* var. *glabrata,* Lehm.) "Leaves subglabrous on both sides, the lobes of the leaflets silky-tufted at the apex." — Rocky Mts. of British America (Drummond).

7. P. HOOKERIANA, Lehm. Densely white-tomentose and villous, the leaves greener above; stems 3 – 5′ high; leaflets three, cuneate-ovate, 5 – 8″ long, incised nearly to the midvein, the middle one shortly petiolulate; flowers short-pedicelled, in dense cymelets on the slender branches; calyx very silky-villous, the narrow bractlets equalling the acute sepals; petals obcordate, 1½ – 2″ long, equalling or exceeding the calyx; stamens 20. — British America. Specimens collected by Bourgeau on the Saskatchewan accord with Lehmann's description and figure.

8. P. PULCHELLA, R. Br. Dwarf, arctic, silky-villous and tomentose; stems 1 – 4′ high, 1 – 3-flowered, slender, naked; leaves pinnately 3 – 5 foliolate, the ovate leaflets 3 – 6″ long, coarsely cleft nearly to the midvein, the linear-oblong lobes divaricate; bractlets broad, equalling the sepals; petals obovate or obcordate, 2″ long, equalling the calyx; stamens 20. — Arctic America and Greenland (Parry; Kane; Hayes).

II. Styles filiform, not glandular at base; inflorescence cymose. — Spec. 9 – 29.

* Style terminal (or nearly so in *P. brevifolia*); carpels glabrous,

mostly sessile; disk not thickened; stamens 20, rarely 25; herbaceous perennials with conspicuous yellow flowers.

† Leaves pinnate (or sometimes digitate in *P. Hippiana* and *diversifolia*); carpels usually 10 – 30; bractlets shorter than the sepals.

9. P. HIPPIANA, Lehm. Densely white-tomentose and silky throughout, the upper surface of the leaves a little darker; stems ascending, 1 – 1½° high, slender, branching above into a diffuse cyme; stipules usually entire; leaves occasionally digitate, especially in reduced alpine specimens; leaflets 5 – 11, cuneate-oblong, 1 – 2′ long, obtuse, incisely toothed at least toward the apex, margin not revolute; pedicels slender; bractlets narrow; petals 2½ – 3½″ long, exceeding the calyx. — From the Saskatchewan to Nebraska, Colorado, New Mexico, and Northern Arizona.

Var. PULCHERRIMA. (*P. pulcherrima*, Lehm. *P. diffusa*, Gray. *P. Pennsylvanica*, var. *pulcherrima*, Torr. & Gray.) Stems 1 – 2° high; leaflets 5 – 9, approximate, crowded, or digitate, the terminal one 1 – 3′ long, the upper surface green and pubescent or subglabrous. — From the Rocky Mts. of British America to New Mexico and Northern Nevada; Ft. Vancouver (Alvord).

10. P. EFFUSA, Dougl. Tomentose throughout, with scattered villous hairs; stems ascending, 4 – 12′ high, diffusely branched above; stipules lanceolate, entire or incised; leaflets 5 – 11, interruptedly pinnate, the alternate ones often smaller, cuneate-oblong, coarsely incised-serrate or dentate, the smaller leaflets 3 – 5-toothed; pedicels slender; sepals and the much smaller bractlets acuminate, 2 – 3″ long, equalling or exceeding the obcordate petals; carpels 10. — Saskatchewan (Douglas); Rocky Mts. of British America (Bourgeau), and Colorado (Nuttall; Porter; Gray). Scarcely more than a form of the last.

11. P. CRINITA, Gray. Appressed silky-villous, not at all tomentose; stems decumbent, 1° long; stipules lanceolate, entire; leaflets 9 – 15, mostly folded and falcately recurved, ½′ long, cuneate-oblong, obtuse, coarsely serrate, villous beneath, scarcely so or glabrous above; cyme loosely paniculate; sepals acute, nearly 3″ long, the bractlets a little shorter; petals obovate, retuse, exceeding the calyx; carpels 25 – 30. — Collected only by Fendler (199), near Santa Fé, New Mexico.

12. P. BREWERI. Alpine; stems decumbent at base, rather stout, 3 – 10′ long; densely white-tomentose throughout, the calyx and upper

leaves appressed silky-villous; stipules broad, mostly incised; leaflets 7 – 13, nearly uniform in size, 3 – 6″ long, broadly cuneate, deeply incised; cymes mostly crowded; flowers rather large, the emarginate petals 3 – 5″ long, much exceeding the calyx; carpels 20 – 25, on villous pedicels, the receptacle and disk hairy. — Mono Pass in the Sierra (1720 Brewer); summit above Cisco (Bolander).

13. P. PLATTENSIS, Nutt. Subalpine; pubescence throughout appressed silky-villous, scanty or nearly wanting; stems decumbent, slender, 3 – 12′ long; stipules linear-lanceolate to oblong, mostly entire; leaflets 7 – 13, usually crowded and often alternate, 2 – 6″ long, ovate, deeply incised-pinnatifid into 3 – 7 linear segments; flowers few, on slender pedicels, in an open cyme; petal 2 – 3″ long, usually exceeding the calyx, obovate and entire or retuse, or obcordate; carpels 25 – 40. — Rocky Mts. of Colorado. *P. diversifolia*, var. *pinnatisecta*, Watson (331 and 332), from the Clover Mts., Nevada, and the Uintas, must probably be referred here, though more densely silky, and the hairs upon the calyx spreading.

14. P. DISSECTA, Pursh. (*P. diversifolia*, *P. Drummondii*, and *P. rubricaulis*, Lehm.) Low, alpine, more or less silky-villous, with somewhat spreading hairs, or nearly glabrous; stems decumbent or ascending, 3 – 12′ long; stipules ovate- or oblong-lanceolate, entire; leaflets 5 – 7, or rarely but three, often glaucous, closely pinnate, or as frequently digitate, the upper one 1′ long or less, cuneate-oblong, incisely pinnatifid or serrate, the lowest often but trifid, the segments acute or acutish, and more or less tufted with white hairs; flowers few, on slender pedicels in an open cyme; calyx more or less villous with spreading hairs, the bractlets short, the lanceolate sepals shorter than the petals, which are 2 – 4″ long, obovate and retuse or obcordate; receptacle very villous; carpels 10 – 20, or more. — From British America to Colorado and California.

An examination of the original specimen of *P. dissecta* from "Hudson's Bay" in Herb. Banks (kindly made by Mr. Trimen of the British Museum) shows that it is but one of the several forms that have been referred to *P. diversifolia*, "from which it seems only to differ in its larger size, less amount of hairiness (the under side of the leaves only slightly pilose), and more deeply cut leaflets." Pursh's name must be retained as the oldest. A quite variable species, but strongly marked. The frequent form with nearly glabrous leaves is var. GLAUCOPHYLLA, Lehm. A rather stout and glabrous form with larger and more distant leaflets is *P. Drummondii*, Lehm. A subdigitate form with the leaflets linear-parted is var. MULTISECTA, Watson. *P. rubricaulis*, Lehm., appears to be a form with the leaflets subtomentose beneath, a case of rather rare occurrence.

Var. DECURRENS. Leaflets but three or with 1 – 2 additional distant pairs of smaller ones, the terminal leaflet cuneate-oblong, truncately 3-toothed, the upper pair 2 – 3-toothed, conspicuously decurrent, the lowest lanceolate and mostly entire; stem 1-flowered, 3′ high; glabrous throughout, excepting the villous calyx and tufted apices of the leaves. — 329 Watson, from peaks of the Uintas, at 12,000 feet altitude. A very peculiar form, perhaps distinct.

† † Leaves digitately 5 – 7-foliolate (rarely pinnate in *P. gracilis*); tomentose or villous.

15. P. GRACILIS, Dougl. (*P. Blaschkeana*, Turcz.) Villous and more or less tomentose; stems 2 – 3° high; stipules ovate or lanceolate, entire or subincised; leaflets mostly 7, sometimes 5, very rarely but 3, cuneate-oblong, obtuse, incisely serrate or pinnatifid, tomentose beneath, green above and subvillous or appressed-silky, 1 – 2½′ long; flowers in a loose subfastigiate cyme, the pedicels at length elongated and slender; calyx with the narrow bractlets shorter than the broad acute or lanceolate sepals; petals broadly obcordate, 3 – 4″ long, a little exceeding the calyx; carpels very numerous (40 or more). — From the Saskatchewan to Southern Alaska, and southward to New Mexico, Utah, and California. The leaflets occasionally show a tendency to a pinnate arrangement, and the species is distinguishable from the digitate form of *P. Hippiana*, var. *pulcherrima*, only by the more numerous carpels and the usually fewer and more deeply incised leaflets. Specimens like 159 Hall & Harbour tend to unite the two species.

Var. FLABELLIFORMIS. (*P. flabelliformis*, Lehm.) Differing only in the more deeply pinnatifid leaflets.

Var. FASTIGIATA (*P. fastigiata*, Nutt., *P. olopetala*, Lehm.) is a form, often low, with a shorter and more crowded cyme, the pubescence more dense and silky, especially upon the calyx and short pedicels.

Var. RIGIDA. (*P. rigida*, Nutt., not Wall. *P. Nuttallii*, Lehm.) A mostly stout and tall form, villous but without tomentum, the cyme loose or crowded, the leaves often large, 3 – 4′ long or more, and prominently veined beneath. — The leaves are occasionally decidedly pinnate, as in 162 Hall & Harbour. Certainly but a variety of *P. gracilis*.

16. P. ARGENTEA, L. Densely white-tomentose throughout and subvillous, excepting the smooth green upper surface of the leaves; stems short, ascending or decumbent; stipules lanceolate, entire, or toothed; leaflets 5, cuneate-obovate to narrowly oblanceolate, ½ – 1′ long, coarsely incised from above the base or only few-toothed towards the apex, the margin mostly revolute; flowers few to many, in a close or loosely panicled cyme, the pedicels short or often slender and elongated; sepals and bractlets equal, acute; petals obovate, 2″ long or less, equalling the calyx; achenia very numerous, dotted; style short but rather slender. — New England to Canada and Michigan.

17. P. HUMIFUSA, Nutt. (*P. concinna*, Rich.) Densely white-tomentose and silky-villous; stems decumbent, 2 – 4′ long, slender; leaflets 5, cuneate-oblong, 6 – 9″ long, green and appressed-silky above, only the rounded or truncate apex serrate with 3 – 5 teeth; flowers 3 – 5, on slender pedicels; bractlets narrow, shorter than the acute sepals; petals 2 – 3″ long, obcordate, exceeding the calyx; carpels 15 – 20. — From the Saskatchewan to the Rocky Mts. of Colorado.

† † † Leaves ternate (quinate in *P. maculata*, and very rarely quinate or pinnately 5-foliolate in *P. nivea*); low, arctic or alpine, sparingly villous or subglabrous (densely tomentose or villous in *P. nivea* and *fragiformis*); flowers few, in a loose cyme, or solitary, the obcordate petals exceeding the calyx; carpels 10 – 40.

18. P. NIVEA, L. (*P. Vahliana*, Lehm.) Pubescence silky-villous, often abundant, densely white-tomentose on the under side of the leaves and sometimes upon the calyx; stems 2 – 12′ high; leaflets cuneate-obovate or -oblong, 3 – 8″ long, coarsely incised-serrate or pinnatifid, the terminal one sessile or petiolulate; flowers few or solitary on slender pedicels; bractlets acute or acutish, shorter than the sepals; petals 2 – 4″ long; carpels few or many. — Labrador, Greenland, throughout Arctic America and in the Rocky Mts. southward to Colorado and the Uintas. *P. Vahliana* seems to be but a reduced large-flowered form. The var. *concolor*, R. Br., without tomentum, is to be referred to *P. emarginata*, having the peculiar calyx of that species. Most Labrador and some Greenland specimens, which have been considered *P. nivea*, are for the same reason rather to be carried to *emarginata*, though more or less tomentose. Some Rocky Mountain specimens so simulate reduced forms of *P. Hippiana* or *gracilis*, that, but for their ternate leaves, they might as well be so considered. The following variety makes the connection yet more close.

Var. DISSECTA. Leaves digitately or pinnately 5-foliolate, the leaflets deeply pinnatifid; dwarf, the stems 1 – 2′ high, 1 – 3-flowered. — In the Rocky Mts. of British America and Montana (368 Drummond; Douglas; Howard); and in the Uintas, Utah (335 Watson, in part), at 12,000 feet altitude.

19. P. FRAGIFORMIS, Willd. Villous with long silky hairs; stems ½ – 1° high; stipules large, oblong, acuminate; leaflets cuneate-obovate, 6 – 15″ long, sessile, coarsely incised-serrate; flowers few or solitary, very large; bractlets ovate, obtuse, shorter than the ovate acute sepals; petals obcordate, 3 – 6″ long, exceeding the calyx. — Aleutian Islands (Pallas); St. Paul's Island (Harrington).

Var. VILLOSA, Regel & Tiling. (*P. villosa*, Pall.) Densely white-tomentose, the upper surface of the leaves darker. — Alaska to Vancouver's Island; Mt. Ranier, Washington Territory (Tolmie).

20. P. MACULATA, Pour. (*P. Salisburgensis*, Hænke. *P. opaca*, Pursh, not L.) Sparingly villous with long spreading hairs, the pedicels subtomentose; stems ascending, 3 – 6′ high, loosely few-flowered; stipules ovate to lanceolate, entire; leaflets 5, rarely but 3, cuneate-obovate, ½ – 1′ long, rounded and incisely serrate at the apex; bractlets obtuse or obtusish, a little shorter than the acute sepals; petals cuneate-obcordate, 3 – 4″ long, exceeding the calyx. — Labrador; Greenland.

21. P. EMARGINATA, Pursh. (*P. nana*, Lehm. *P. nivea*, var. *concolor*, R. Br.) Rather more villous than the last, the pedicels densely tomentose, the leaves rarely tomentose beneath; stems ascending or erect, 1 – 3′ high; leaflets obovate, 2 – 6″ long, the terminal one shortly petiolulate or sessile, very coarsely incised, the 3 – 5 segments villous-tufted; flowers 1 – 2, mostly solitary; bractlets and sepals equal, broad, obtuse; petals 2 – 3″ long, considerably exceeding the calyx; carpels numerous. — Labrador; Greenland; Kotzebue Sound; Rocky Mountains (Drummond). *P. nana* is the more reduced form.

22. P. GELIDA, C. A. Meyer. (*P. flabellifolia*, Hook.) Nearly glabrous, with a scanty minute or villous pubescence; stems slender, 6 – 10′ high, 1 – 3-flowered; stipules oval or oblong, mostly entire; leaflets very broadly cuneiform, 6 – 9″ long, rounded at the apex and incisely 7 – 9-toothed, entire at base, the middle leaflet shortly petiolulate; bractlets and sepals nearly equal, obtuse or acute; petals 2 – 3″ long, obcordate, a little exceeding the calyx; carpels numerous. — Washington Territory and Oregon; Mt. Ranier (Douglas); Crater

Pass (Newberry); Cascade Mts. (Lyall). Our plant seems to accord perfectly with the Asiatic species.

23. P. GRAYI. Pubescence scanty, villous; stems slender, 3 – 6′ high, 3 – 6-flowered; stipules ovate or oblong, entire; leaflets very broad and suborbicular, ½′ long, the truncate or rounded apex 5 – 7-toothed, the middle leaflet long-petiolulate; sepals acute, the bractlets but half as long and obtusish; petals 2 – 3″ long, orbicular, retuse, exceeding the calyx; carpels 15 – 20. — Yosemite Valley (Bolander; Gray); Lake Tenayo (Brewer); Gray's Peak, Colorado (Gray).

24. P. FRIGIDA, Vill. Very reduced, but ½ – 2′ high, villous; leaflets broadly cuneate-obovate, 3 – 5-toothed at the summit, 2 – 4″ long, nearly glabrous above; flowers solitary, small, on very slender stems; bractlets and sepals equal, obtuse; petals obcordate, 1½″ long, a little exceeding the calyx; carpels numerous, but achenia few. — White Mts., New Hampshire. Differing from the European plant only in its rather smaller flowers.

25. P. BREVIFOLIA, Nutt. Minutely glandular-puberulent, the calyx very sparingly villous; stems decumbent or ascending, 2 – 3′ high; stipules ovate, entire; leaflets suborbicular, 2 – 3″ long, 2 – 3-lobed and crenately toothed, the middle one petiolulate; bractlets acute, shorter than the acute sepals; petals "obovate," scarcely exceeding the calyx; style attached below the apex of the ovary. — Collected only by Nuttall; "Summit of Rocky Mts. (Oregon), near line of perpetual snow, near lat. 42°."

* * Style terminal or medial; carpels glabrous; disk thickened or glandular; stamens 20; herbaceous perennials, smooth or nearly so, with large purple or yellow flowers.

26. P. PALUSTRIS, Scop. (*Comarum*, L.) Stems stout, ascending from a decumbent rooting perennial base, ½ – 2° long; glabrous below, minutely silky or glandular-pubescent above; lower stipules amplexicaul and long-adnate to the petiole, the upper broadly ovate, entire; leaves pinnate; leaflets 5 – 7, oblong, 1 – 2′ long, obtuse or acute, lighter-colored, and more or less pubescent beneath; flowers dark-purple, few, in an open cyme; calyx large and purplish, the sepals becoming 6 – 10″ long in fruit, the bractlets linear, acuminate, and much shorter; petals spatulate, acute, 2 – 3″ long; stamens with stout, fleshy filaments, in one row upon the margin of the thickened disk; carpels very numerous, sessile upon the large spongy receptacle; style attached

to the middle of the ovary. — New England, and from the Great Lakes northward to Greenland, the Arctic Circle, and Alaska.

27. P. THURBERI, Gray. Stems ascending, slender, 2° high; pubescence subvillous or minute; stipules ovate, incisely toothed; leaves digitate; leaflets 5 – 7, obovate to oblong, 2′ long, obtuse, nearly glabrous, coarsely serrate; flowers dark purple, in an open cyme; calyx large, the bractlets equalling the sepals; petals 3″ long, very broadly obcordate, equalling the calyx; disk thickened, pentagonal, bearing at the angles opposite to the sepals the 5 inner stamens with stout fleshy filaments, the 15 outer stamens with slender filaments arising from the margin of the base of the calyx; carpels numerous, sessile on the short hairy receptacle; style terminal. — New Mexico.

28. P. BIFLORA, Willd. Dwarf, cæspitose, the ascending stems slender, 2 – 3′ high; pubescence villous, the pedicels subtomentose; leaves all radical, ternate; the middle leaflet petiolulate and 3-parted, the lateral 2-parted, the linear segments 3 – 6″ long with strongly revolute margins and villous-tufted, becoming nearly glabrous above; flowers 1 – 5, yellow; bractlets broad, equalling the acute sepals; petals cuneate-obcordate, 2½″ long, exceeding the calyx; disk glandular between the five inner stamens, lobed; filaments all subfiliform; carpels 15 – 30, short-pedicelled, the pedicels and small receptacle villous with long hairs; style attached below the apex of the ovary. — On the Arctic Coast and in Siberia. No American specimens found in our collections.

* * * Style attached below the middle of the ovary; carpels on short pedicels, and, with the receptacle, densely villous; disk not thickened; more or less woody perennials.

29. P. FRUTICOSA, L. Shrubby, much branched, 1 – 4° high; pubescence silky-villous; stipules scarious; leaves pinnate; leaflets 5 – 7, crowded, oblong-lanceolate, 2 – 12″ long, entire, usually whiter beneath and the margins revolute; flowers on slender pedicels in rather loose cymes or solitary; bractlets equalling the acute sepals; petals yellow, orbicular, 2 – 6″ long, exceeding the calyx; stamens 30; carpels 20. — From New Jersey to Labrador and Wisconsin, and northward to the Arctic Circle and Behring Strait, and in the mountains to Colorado, Nevada, and Northern California.

Var. PARVIFOLIA. An alpine form, with minute densely silky leaves, 2″ long, and small flowers. — E. Humboldt Mts., Nevada, and in the Wahsatch.

30. P. TRIDENTATA, Soland. Caudex woody, creeping, branched and tufted, the ascending herbaceous stems 1 – 10′ high, subnaked; pubescence sparse, silky, appressed; stipules lanceolate, entire; leaves ternate; leaflets subcoriaceous and shining above, cuneate-oblong, ½ – 1′ long, 3 – 5-toothed at the truncate apex; flowers white, loosely cymose; bractlets nearly equalling the sepals, smoother; petals obovate-oblong, 2 – 3″ long, exceeding the calyx; stamens and carpels 20, the achenia becoming sparingly villous. — Higher peaks of the Alleghanies and White Mts.; coast of Massachusetts; Labrador; Greeenland; and from the Great Lakes to lat. 64°. *P. retusa*, Müller (*Fl. Dan.* 5, t. 799), is the older name by several years, but is less appropriate.

III. Style filiform, attached to the middle of the ovary or below the apex; peduncles axillary, solitary, 1-flowered; carpels glabrous, short-pedicelled, the pedicel and receptacle very villous; herbaceous perennials with mostly creeping or decumbent stems; flowers yellow.

31. P. ANSERINA, L. Spreading by slender many-jointed runners, white-tomentose and silky-villous; stipules many-cleft; leaves all radical, pinnate; leaflets 7 – 21, with smaller ones interposed, oblong, sharply serrate, silky-tomentose at least beneath; bractlets often incisely cleft, about equalling the sepals; petals oblong, broadly elliptical and entire or obcordate, 3 – 6″ long, exceeding the calyx; stamens 20, rarely 25; carpels 20 – 40; style attached to the middle of the ovary. — Pennsylvania to Illinois, New Mexico and California, and northward to the Arctic Ocean and Greenland. Very variable in size and pubescence, from the wholly glabrous minute plant of Greenland to the ordinary form with leaflets nearly or quite glabrous above or equally silvery-silky on both sides, and the still larger western form with leaves often 1 – 2° long.

32. P. CANADENSIS, L. Stems slender and decumbent or prostrate; pubescence villous, often scanty; stipules mostly entire; leaves ternate, the lateral leaflets parted nearly to the base, cuneate-oblong or -obovate, incisely serrate, nearly glabrous above; peduncles exceeding the leaves; bractlets longer than the sepals, entire; petals broadly obovate or obcordate, 2 – 3″ long; stamens 20; carpels 20 – 40; style attached

below the summit of the ovary. — Canada to Georgia and westward to Arkansas and the Saskatchewan.

Var. SIMPLEX, Torr. & Gray. With stouter and more ascending stems, 1 – 2° long, rarely creeping; less hairy.

33. P. NEMORALIS, Nestl. Stolons filiform; pubescence minute, appressed; leaves ternate, occasionally quinate; leaflets cuneate-obovate, 4 – 9″ long, subpetiolulate, coarsely serrate, sparingly villous; sepals and petals usually 4, the bractlets a little shorter; petals 2 – 3″ long, obcordate; style attached below the apex of the ovary. — Reported from Labrador and a specimen preserved in herb. Hooker, but collector not stated. Possibly not American.

Doubtful and Excluded Species.

P. DIGITATO-FLABELLATA, Br. & Bouch., is said to have originated from "North America." Tall and loosely corymbose; leaves quinate; leaflets slightly hairy above, subcanescent and tomentose beneath, cuneate-flabellate, trifid or incisely lobed, the unequal segments acute; bractlets equalling the sepals; petals obovate, subretuse, equalling or exceeding the calyx. Known only in cultivation in Europe.

P. MULTIJUGA, Lehm., appears both from the figure and description in Lehmann's *Revisio* to be *Horkelia Californica*, var. *cuneata*, except only that it is scarcely supposable that the peculiar characteristics of the flower could have escaped notice. No true *Potentilla* is found that answers to the description.

SYNONOMY.

31. POTENTILLA ANSERINA. Linn., Spec., 495. For foreign synonomy consult Lehmann's Monograph, p. 74, and Revisio, p. 188, and Ledebour, Fl. Ross., 2. 44. — Michx., Flora, 1. 304. James, Long's Exped., 2. 342. Cham. & Schlecht., Linnæa, 2. 24. Meyer, Pl. Lab., 76. Hook., Fl. Bor. Am., 1. 189. Bongard, Veg. Sitch., 132. Schlecht., Fl. Lab. in Linn., 10. 98. Hook. & Arn., Bot. Beech., 123 and 338. Torr. & Gray, Flora, 1. 444. Torrey, Frem. Rep., 89; Pac. R. R. Rep., 4. 84. Gray, Pl. Fendl., 42. Seemann, Bot. Herald, 29 and 52. Engelm., Pl. Upp. Miss., 191. Newberry, Pac. R. R. Rep., 6. 72. Cooper, Pac. R. R. Rep., 12. 38, 43, and 59. Hook. f., Distrib. Arc. Pl., 290. Bourgeau, Palliser's Rep., 256. Rothr., Fl. Alaska, 445. Gray, Manual, 155. Bolander, Cat., 12. Watson, King's Rep., 5. 89. — Collectors numerous.

Var. GRANDIS. Lehm. in Hook. Fl. Bor. Am., 1. 189; Revis., 190. Torr. & Gray, Flora, 1. 444. Ledeb., Fl. Ross., 2. 44.

Var. GRŒNLANDICA. Hook., Parry's 3d Voy., Appx., 125; Fl. Bor. Am., 1. 189.

Nestler, Monograph, 35. Seringe in DC. Prodr., 2. 582. Schlecht. in Linn., 10. 88. Torr. & Gray, Flora, 1. 444. Lehm., Revis., 190.

P. Egedii. Wormsk., Fl. Dan., 9. t. **1578.** Seringe, DC. Prodr., 2. 582. Spreng., Syst., 2. 535. Lehm., Monog., 74. Don's Mill., 2. 560. Dietr., Syn., 3. 189.

P. Anserina, var. *Egedii.* Torr. & Gray, Flora, 1. 444.

16. POTENTILLA ARGENTEA. Linn., Spec., 497. See Lehm., Monog., 94, and Revis., 96; Ledeb., Fl. Ross., 2. 47. — Pursh, Flora, 355. Torrey, Fl. U. S., 1. 497. Lehm.; Hook., Fl. Bor. Am., 1. 191. Torr. & Gray, Flora, 1. 441. Torr., Nicollet's Rep., 149. Gray, Manual, 154.

1. POTENTILLA ARGUTA. Pursh, Flora, 636. Poir., Suppl., 4. 538. Richardson, Frankl. 1st Voy., Appx., 20. Lindl., Bot. Reg., 16. t. **1379.** Hook. (& Lehm.), Fl. Bor. Am., 1. 186, t. **63.** Don's Mill., 2. 558. Torr. & Gray, Flora, 1. 445. Walpers, Rep., 2. 35. Dietr., Syn., 3. 186. Torrey, Nicollet's Rep., 149; Fremont's Rep., 89. Engelm., Pl. Upp. Miss., 190. Lehm., Revis., 50. Cooper, Pac. R. R. Rep., 12. 43. Bourgeau, Palliser's Rep., 256. Gray, Manual, 154. — Bradbury; Richardson; James; Bourgeau; Lyall; Hall & Harbour; Hayden; Bebb; and others.

Geum agrimonioides. Pursh, Flora, 351. Spreng., Syst., 2. 543.

Boottia sylvestris. Bigelow, Fl. Bost., 2 ed., 206.

P. Pennsylvanica, var. *arguta.* Torrey, Ann. N. Y. Lyc., 2. 197; not Seringe in DC. Prodr.

P. confertiflora. Torrey, Flora U. S., 1. 449. Spreng., Syst., 4. 189. Lehm., Nov. Stirp., pug. 3. 24.

Var. FERRUGINEA. Lehm., Revis., 50.

P. ferruginea. Dougl.; "Paxt. Mag., 5. t. **233.**"

P. Bigelowiana. Wenderoth, "Sem. h. Marb. 1841"; (Litt. Ber. zu Linn., 16. 112.)

28. POTENTILLA BIFLORA. "Willd.; Schlecht., Mag. Ges. Nat. Berl., 7. 297." See Lehm., Monog. and Revis., and Ledeb., Fl. Ross.— Richardson, Franklin's 1st Voy., Appx., 21. Lehm., Monog., 192, t. **20**; Revis., 20, t. **62.** Cham. & Schlecht., Linn., 2. 24. Hook., Fl. Bor. Am., 1. 195. Hook. & Arn., Bot. Beech., 123. Torr. & Gray, Flora, 1. 442. Dietr., Syn., 3. 180. Ledeb., Fl. Ross., 2. 61. Seemann, Bot. Herald, 29. Hook. f., Journ. Linn. Soc., 1. 124; Distrib. Arc. Pl., 290. Rothr., Fl. Alaska, 445. — "Richardson; Beechey; Seemann; Rae."

25. POTENTILLA BREVIFOLIA. Nutt.; Torr. & Gray, Flora, 1. 442. Lehm., Revis., 46. Dietr., Syn., 3. 183. Walp., Rep., 2. 34. — Nuttall.

12. POTENTILLA BREWERI. — No. 1720 Brewer; Bolander.

32. POTENTILLA CANADENSIS. Linn., Spec., 498. Michx., Flora, 1. 303. Nestler, Monog., 58, t. **10.** Elliott, Sketch, 1. 574. Torrey, Fl. U. S., 1. 426. Seringe, DC. Prodr., 2. 575. Spreng., Syst., 2. 538. Lehm., Monog., 118; Hook., Fl. Bor. Am., 1. 192; Revis., 187. Darlington, Fl. Cestr., 303. Don's Mill., 2. 552. Torr. & Gray, Flora, 1. 443. Engelm., Pl. Upp. Miss., 191. Cooper, Pac. R. R. Rep., 12. 43. Bourgeau, Palliser's Rep., 256. Chapman, Flora, 124. Gray, Manual, 154.

P. pumila. Poir., Dict., 5. 594. Pursh, Flora, 354. Spreng., Syst., 2. 573.

P. sarmentosa. Willd., Enum., 1. 554. Nestler, Monog., 64. Bigelow, Fl. Bost., 2 ed., 204. Dietr., Syn., 3. 180.

Var. SIMPLEX. Torr. & Gray, Flora, 1. 443. Lehm., Nov. Stirp., pug. 9. 72; Revis., 188. Gray, Manual, 154.

P. simplex. Michx., Flora, 1. 303. Nestler, Monog., 40, t. 9. Lehm., Monog., 118; Hook., Fl. Bor. Am., 1. 192. Elliott, Sketch, 1. 574. Seringe, DC. Prodr., 2. 575. Spreng., Syst., 2. 538. Don's Mill., 2. 552.

P. Caroliniana. Poir., Dict., 5. 595. Pers., Ench., 2. 55.

11. POTENTILLA CRINITA. Gray, Pl. Fendl., 41. Walpers, Ann., 2. 480. Lehm., Revis., 63, t. 21. — No. 199 Fendler.

14. POTENTILLA DISSECTA. Pursh, Flora, 355. Seringe, DC. Prodr., 2. 575. Spreng., Syst., 2. 536. Lehm., Nov. Stirp., pug. 3. 20; Revis., 28. Hook., Fl. Bor. Am., 1. 193. Don's Mill., 2. 553 and 560. Nuttall, Jour. Acad. Phil., 7. 20. Torr. & Gray, Flora, 1. 446. Dietr., Syn., 3. 180 and 190. — Wyeth; Nuttall; Drummond; Bourgeau; Lyall; 219 Parry; 2715 Brewer; 5084 Bolander; 327 Watson; 135 Hall.

P. diversifolia. Lehm., Nov. Stirp., pug. 2. 9; Hook., Fl. Bor. Am., 1. 190; Revis., 72, t. 31. Don's Mill., 2. 556. Torr. & Gray, Flora, 1. 439. Walpers, Rep., 2. 33. Dietr., Syn., 3. 185. Torrey, Fremont's Rep., 89. Engelm., Pl. Upp. Miss., 191. Bourgeau, Palliser's Rep., 256 and 262; Gray, in Am. Jour. Sci., 2 ser., 33. 411. Watson, King's Rep., 5. 86.

P. Drummondii. Lehm., Nov. Stirp., pug. 2. 9; Hook., Fl. Bor. Am., 1. 189, t. 65; Revis., 66. Don's Mill., 2. 558. Torr. & Gray, Flora, 1. 439. Walpers, Rep., 2. 32. Dietr., Syn., 3. 178. Bourgeau, Palliser's Rep., 256. Gray, Proc. Acad. Phil., 1863, 61.

P. rubricaulis. Lehm., Nov. Stirp., pug. 2. 11; Hook., Fl. Bor. Am., 1. 191; Revis., 68, t. 30. Don's Mill., 2. 556. Torr. & Gray, Flora, 1. 438. Walpers, Rep., 2. 32. Dietr., Syn., 3. 185.

Var. GLAUCOPHYLLA. Lehm., Revis., 73. Watson, King's Rep., 5. 86, in part. — Burke; 218 Parry; 171 Vasey; 328 Watson.

P. glaucophylla. Lehm., Del. Sem. h. Hamb., 1836, 7; (Litt. Ber. zu Linn., 1838, 83.) Walpers, Rep., 2. 33.

Var. MULTISECTA. Watson, King's Rep., 5. 86. — No. 159 Hall & Harb., in part; 330 Watson.

Var. DECURRENS. — No. 329 Watson.

10. POTENTILLA EFFUSA. Dougl.; Lehm., Nov. Stirp., pug. 2. 8; Hook., Fl. Bor. Am., 1. 87; Revis., 64, t. 22. Don's Mill., 2. 557. Torr. & Gray, Flora, 1. 437. Dietr., Syn., 3. 186. Walpers, Rep., 2. 32. Hook., Pl. Geyer in Lond. Jour. Bot., 6. 219. Engelm., Pl. Upp. Miss., 191. Bourgeau, Palliser's Rep., 256. — Douglas; Nuttall; Bourgeau; Porter; Gray.

Var. GOSSYPINA. Torr. & Gray, Flora, 1. 437. Lehm., Revis., 64.

P. gossypina. Nutt.; Hook., Pl. Geyer in Lond. Jour. Bot., 6. 219.

21. POTENTILLA EMARGINATA. Pursh, Flora, 353. Lehm., Monog., 174; Revis., 161. Spreng., Syst., 2. 540. Hook., Fl. Bor. Am., 1. 194. E. Meyer, Fl. Lab., 74. Don's Mill., 2. 551. Torr. & Gray, Flora, 1. 446. Hornem., Fl. Dan.,

13. t. **2291**. Dietr., Syn., 3. 179. Seemann, Bot. Herald, 29, 51, and 56. Rothr., Fl. Alaska, 445. — Franklin; Parry; Drummond; Kane; Hayes.

P. nana. " Willd., Mag. Berl., 7. 296." Lehm., Monog., 181, t. **17**; (Spreng., Neue Entdeck., 2. 298;) Hook., Fl. Bor. Am., 1. 194. Seringe in DC. Prodr., 2. 573. Spreng., Syst., 2. 541. Don's Mill., 2. 550. Hook. & Arn., Bot. Beech., 123. Torr. & Gray, Flora, 1. 441. Dietr., Syn., 3. 179. Ledeb., Fl. Ross., 2. 56. Seller, Ann. & Mag. Nat. Hist., 1 ser., 16. 170. Seemann, Bot. Herald, 29 and 55. Hook. f., Jour. Linn. Soc., 1857, 121. Rothrock, Fl. Alaska, 445.

P. verna. " Hook. in Scoresby's Greenland, 421."

P. Grœnlandica. R. Br., Ross's Voy., 142.

P. nivea, var. *concolor.* R. Br., Parry's 1st Voy., Appx., 277. Hook., Parry's 2d Voy., Appx., 395. Torr. & Gray, Flora, 1. 441.

P. nivea, var. *arctica.* Lehm., Revis., 167, in part.

" *P. frigida?* Greville, Mem. Wern. Soc., 4. 430."

P. nivea, var. *Vahliana.* Durand, in Kane's Exped., 2. 453; not Torr. & Gray.

19. Potentilla fragiformis. " Willd. in Mag. Berl., 7. 294." Lehm., Monog., 163, t. **15**; (Spreng., Neue Entdeck., 2. 298;) Hook., Fl. Bor. Am., 1. 194; Revis., 155. Seringe, DC. Prodr., 2. 586. Spreng., Syst., 2. 540. Don's Mill., 2. 550. Ledeb., Fl. Ross., 2. 59, with full synonomy. Dietr., Syn., 3. 178. Regel & Tiling; Fl. Ajan., 85, with syn. — Pallas; Dall.

Var. villosa. Regel & Tiling, l. c. — Mertens; Barclay; Tolmie; Scouler; Wood; Bischoff; Bannister; Harrington.

P. villosa. Pall.; Pursh, Flora, 353. Lehm., Monog., 166, t. **16**; Hook., Fl. Bor. Am., 1. 194; Revis., 171. Seringe, DC. Prodr., 2. 573. Spreng., Syst., 2. 540. Cham. & Schlecht., Linn., 2. 22. Bongard, Veg. Sitch., 132. Don's Mill., 2. 550. Hook. & Arn., Bot. Beech. 123. Torr. & Gray, Flora, 1. 442. Dietr., Syn., 3. 178. Ledeb., Fl. Ross., 2. 58. Presl, Epimel. Bot., 198. Seemann, Bot. Herald, 29. Hook. f., Distrib. Arc. Pl., 290. Rothrock, Fl. Alaska, 445.

P. lucida. " Willd., Berl. Mag., 7. 296."

P. leucochroa. " Lindl., Wall. Cat. Pl. Ind."

24. Potentilla frigida. Vill., Fl. Delph., 3. 563. See synonomy in Lehm., Revis., 158. — Hook. f., Distrib. Arc. Pl., 290 and 326. Durand, Kane's Exped., 2. 454. Gray, Manual, 154.

P. Robbinsiana. Oakes, MS. in herb.

P. minima. Gray, Manual, 1 ed., 122.

P. minima, var. *Robbinsiana.* Torr. & Gray, Flora, 1. 441. Lehm., Revis., 159.

29. Potentilla fruticosa. Linn., Spec., 495. See synonomy in Ledeb., Fl. Ross., 2. 61, and Lehm., Revis., 16. — Michx., Flora, 1. 304. Pursh, Flora, 355. James, Long's Exped., 2. 215. Torrey, Ann. N. Y. Lyc., 2. 197; Fremont's Rep., 89. Hook., Fl. Bor. Am., 1. 186. Nuttall, Journ. Acad. Phil., 1834, 20. Hook. & Arn., Bot. Beech., 123. Torr. & Gray, Flora, 1. 445. Seemann, Bot. Herald, 29 and 51. Richardson, Arc. Exped., 427. Engelm., Pl. Upp. Miss., 191. Hook. f., Jour. Linn. Soc., 1. 124; Distrib. Arc. Pl., 290. Bourgeau, Palliser's Rep., 256

and 262. Regel, Gart. Flora, 9. **t. 278**. Gray, Proc. Phil. Acad., 1863, 61. Rothrock, Fl. Alaska, 445. Gray, Manual, 155. Watson, King's Rep., 5. 89.

P. floribunda. Pursh, Flora, 355. Don's Mill., 2. 561.

Var. ALPINA. — No. 342 Watson; Wheeler.

22. POTENTILLA GELIDA. C. A. Meyer, Ind. Pl. Cauc., 167. Ledeb., Fl. Ross., 2. 59, with synonomy. Walpers, Rep., 2. 26. Lehm., Revis., 154, with synonomy. — Douglas; Newberry; Lyall; 4971 Bolander; 1685 Brewer.

P. flabellifolia. Hook.; Torr. & Gray, Flora, 1. 442. Dietr., Syn., 3. 183. Walpers, Rep., 2. 34. Lehm., Revis., 153, **t. 51**. Newberry, Pac. R. R. Rep., 6. 72.

2. POTENTILLA GLANDULOSA. Lindl., Bot. Reg., 19. **t. 1583**; (Litt. Ber. zu Linn., 1835, 13.) Hook. & Arn., Bot. Beech., 338. Torr. & Gray, Flora, 1. 446. Dietr., Syn., 3. 187. Walpers, Rep., 2. 35. Engelm., Pl. Upp. Miss., 191. Lehm., Revis., 48. Torrey, Pac. R. R. Rep., 4. 84; Bot. Mex. Bound., 64. Newberry, Pac. R. R. Rep., 6. 72. Watson, King's Rep., 5. 89. Bolander, Cat., 12. — No. 138 Coulter; 197 Fendler; 154 Hall & Harb.; 100 and 240 Stretch; 240 Anderson; 120 Torrey; 6296 Bolander; 260, 625, 1705, 1714, 1767, and 2715 Brewer; 343 Watson; 96 and 97 Eaton; 170 Vasey; 476 Greene; 211 Kell. & Harf.; 134 Hall; Douglas; Nuttall; Tolmie; Fremont; Wilkes; Wallace; Bigelow; Spalding; Cronkhite; Fitch; Smith; Parry; Heermann; Engelmann; Meehan.

P. arguta. Lehm., in Hook., Fl. Bor. Am., 1. 186, in part; not Pursh. Nuttall, Jour Acad. Phil., 7. 21.

P. Oregana and *glutinosa*. Nutt., MS. in herb.

P. fissa. Nuttall; Torr. & Gray, Flora, 1. 446. Dietr., Syn., 3. 187. Walpers, Rep., 2. 35. Hook., Pl. Geyer in Lond. Jour. Bot., 6. 220. Gray, Pl. Fendl., 41; Amer. Jour. Sci., 2. 33. 411; Proc. Phil. Acad., 1863, 61.

P. Wrangeliana. Fisch. & Mey., Ind. Sem. h. Petr., 1840, Animad., 54. Walpers, Rep., 2. 35. Lehm., Revis., 49, **t. 19**.

P. rupestris. Presl, Epimel. Bot., 198.

Var. INCISA. Lindl., Bot. Reg., 13. **t. 1973**.

15. POTENTILLA GRACILIS. Dougl.; Hook., Bot. Mag., **t. 2984**, and Fl. Bor. Am., 1. 192. Don's Mill., 2. 554. Torr. & Gray, Flora, 1. 440. Dietr., Syn., 3. 182. Walpers, Rep., 2. 33. Torrey, Fremont's Rep., 89. Lehm., Revis., 107. Cooper, Pac. R. R. Rep., 12. 52. Watson, King's Rep., 5. 88. — No. 159 Hall & Harb.; 269 Davidson; 336 Watson; 94 Eaton; 103 Greene; 136 Hall; Douglas; Nuttall; Tolmie; Pot. 3, Bourgeau; Kuhn; Parry.

P. Blaschkeana. Turcz.; Lehm. in Otto's Gartenz., 9. 506; Ind. Sem. h. Hamb., 1853, Add. 9; Revis., 107, **t. 64**.

P. nivea, var. Bourgeau, Palliser's Rep., 256.

P. fastigiata? Gray, Proc. Phil. Acad., 1863, 61.

Var. FLABELLIFORMIS. Torr. & Gray, Flora, 1. 440. Newberry, Pac. R. R. Rep., 6. 72. Cooper, Pac. R. R. Rep., 12. 59. Durand, Fl. Utah, 163. Watson, King's Rep., 5. 88. — No. 1826 Brewer; 338 Watson; Nuttall; Bourgeau; Lyall; Spalding.

P. flabelliformis. Lehm., Nov. Stirp., pug. 2. 12; Hook., Fl. Bor. Am., 1. 192,

t. **66**; Monog. Suppl., 13, t. **6**. Don's Mill., 2. 554. Hook., Pl. Geyer in Lond. Jour. Bot., 6. 220. Bourgeau, Palliser's Rep., 256.

Var. FASTIGIATA. — No. 513 Fremont; 203 Fendler; 74 Stretch; 1708 Brewer; 337 Watson; Nuttall; Scouler; Siler.

P. fastigiata. Nutt.; Torr. & Gray, Flora, 1. 440. Dietr., Syn., 3. 182. Walpers, Rep., 2. 33. Gray, Pl. Fendl., 42.

P. olopetala. Lehm., Revis., 78, in part.

P. concinna? Gray, Amer. Jour. Sci., 2. 33. 411.

Var. RIGIDA. — No. 162 Fremont; 98 Bridges; 162 Hall & Harb., in part, and 158, in part; 179 Anderson; 121 and 121a Torrey; 5036 Bolander; 339 Watson; 170 Hayden; 1144 Kell. & Harf.; Nuttall; Spalding; Cronkhite; Pot. 1, Bourgeau.

P. recta? Nutt., Genera, 1. 310.

P. chrysantha. Lehm. in Hook., Fl. Bor. Am., 1. 193. Don's Mill., 2. 554.

P. rigida. Nutt., Jour. Acad. Phil., 7. 20. Torr. & Gray, Flora, 1. 440. Walpers, Rep., 2. 33. Engelm., Pl. Upp. Miss., 191. Newberry, Pac. R. R. Rep., 6. 72.

P. Nuttallii. Lehm., Ind. Sem. h. Hamb., 1852, Add. 12; (Ann. Sci. Nat., 3. 19. 364;) "Otto's Gartenz., 8. 373"; Revis., 89, t. **33**. Watson, King's Rep., 5. 88.

23. POTENTILLA GRAYI. — Nos. 9 and 4971 Bolander; 1685 Brewer; Gray.

9. POTENTILLA HIPPIANA. Lehm., Nov. Stirp., pug. 2. 7; Hook., Fl. Bor. Am., 1. 188, t. **64**; Revis., 62. Don's Mill., 2. 558. — No. 389 Frémont; 216 Parry; 158 and 159 Hall & Harb., in part; 162 and 163 Vasey, and 172, in part; James; Douglas; Nuttall; Bourgeau; Woodhouse; Engelmann; Hayden; Greene.

P. leucophylla. Torrey, Ann. N. Y. Lyc., 2. 197; not Pall.

P. dealbata. Dougl., MS. in herb.

P. Pennsylvanica, var. *Hippiana.* Torr. & Gray, Flora, 1. 438. Torrey, Pac. R. R. Rep., 4. 84. Gray, Proc. Phil. Acad., 1863, 61.

P. diffusa. Torrey, Sitgreave's Rep., 159; not Gray.

Var. PULCHERRIMA. — No. 104 Fremont; 198 Fendler; 217 Parry; 160 Hall & Harb.; 161 and 164 Vasey; 333 and 334 Watson; Drummond; Bourgeau; Bigelow; Alford.

P. pulcherrima. Lehm., Nov. Stirp., pug. 2. 10; Hook., Fl. Bor. Am., 1. 190; Revis., 69, t. **28**. Don's Mill., 2. 556. Watson, King's Rep., 5. 87.

P. Pennsylvanica, var. *pulcherrima.* Torr. & Gray, Flora, 1. 438.

P. diffusa. Gray, Pl. Fendler; not Willd. Torrey, Pac. R. R. Rep., 4. 84.

P. Hippiana, var. *diffusa.* Lehm., Ind Sem. h. Hamb., 1849, Add. 8; (Ann. Sci. Nat., 3. 12. 347;) Revis., 62. Walpers, Ann., 2. 480.

P. rubricaulis. Bourgeau, Palliser's Rep., 256; not Lehm.

7. POTENTILLA HOOKERIANA. Lehm., Ind. Sem. h. Hamb., 1849, Add. 10; Nov. Stirp., pug. 9. 18; (Ann. Sci. Nat., 3. 12. 353;) Revis., 163, t. **55**. Walpers, Ann., 2. 509. — Bourgeau.

17. POTENTILLA HUMIFUSA. Nutt., Genera, 1. 310. Torrey, Ann. N. Y. Lyc., 2. 197. Seringe, DC. Prodr., 2. 574. — Bourgeau; Parry; 157 Hall & Harb.; 21 Greene.

P. concinna. Richardson, Frankl. 1st Voy., Appx., 20. Lehm., Monog. Suppl., 16, **t. 7**; Nov. Stirp., pug. 2. 13; Hook., Fl. Bor. Am., 1. 193, **t. 67**; Revis., 112. Don's Mill., 2. 554. Torr. & Gray, Flora, 1. 443. Dietr., Syn., 3. 183. Walpers, Rep., 2. 34. Bourgeau, Palliser's Rep., 256. Gray, Amer. Jour. Sci., 2. 33. 411; Proc. Phil. Acad., 1863, 61.

P. pulchella. Spreng., Syst., 4. 199; not R. Br.

Tormentilla humifusa. Don's Mill., 2. 562.

P. concinna, var. *humifusa.* Lehm., Revis., 112.

20. Potentilla maculata. Pourret, "Act. Toloss., 3. 316." E. Meyer, Pl. Lab., 75. Lehm., Revis., 119, with full synonomy. — Weiz; Kane; Williams; Rink; Butler.

P. Salisburgensis. Haenke; Jacq., Collect., 2. 68; Icon. Rar., 3. **t. 490**. Torr. & Gray, Flora, 1. 440.

P. opaca. Pursh, Flora, 355; not Linn. Meyer, Pl. Lab., 75. Lehm.; Hook., Fl. Bor. Am., 1. 191. Schlecht., Fl. Lab. in Linn., 10. 95. Torr. & Gray, Flora, 1. 191.

P. aurea. Oerder, Fl. Dan., **t. 114**; not Linn. Schrank, Pl. Lab.

P. aurea, var. *β*. Durand, Kane's Exped., 2. 455.

P. crocea. Hall. Hook. f., Jour. Linn. Soc., 1. 116.

33. Potentilla nemoralis. Nestler, Monog., 65. Lehm., Monog., 147, **t. 13**. Torr. & Gray, Flora, 1. 444. Ledeb., Fl. Ross., 2. 51, with synonomy.

P. procumbens. "Sibth.; Hartm. Handb., 5 ed., 164." Lehm., Revis., 179, with full synonomy.

P. Tormentilla. Seller in Ann. & Mag. Nat. Hist., 1. 16. 170.

18. Potentilla nivea. Linn., Spec., 499. Compare synonomy in Ledeb., Fl. Ross., 2. 57, Lehmann, Revis., 166, and Hook. f., Distrib. Arc. Pl., 325. — Vahl, Fl. Dan., **t. 1035**. Pursh, Flora, 353. R. Br., Parry's 1st Voy., Appx., 277; (Flora, 7. 2, Beilag., 88.) Richardson, Frankl. Journ., 2 ed., Appx., 20. Seringe, DC. Prodr., 2. 572. Cham. & Schlecht., Linnæa, 2. 21. Lehm., Monog., 73; Hook., Fl. Bor. Am., 1. 95. Meyer, Fl. Lab., 74. Torr. & Gray, Flora, 1. 441. Seemann, Bot. Herald, 52. Hook. f., Jour. Linn. Soc., 1. 116 and 121. Dickie, in same, 3. 111 and 11. 33. Gray, Am. Jour. Sci., 2. 33. 411; Proc. Acad. Phil., 1863, 61. Rothrock, Fl. Alaska, 445. Watson, King's Rep., 5. 87. — No. 193 Richardson; 214, 215 Parry; 335 Watson, in part; 172 Vasey, in part; Drummond; Bourgeau; Lyall.

Var. Vahliana. Seemann, Bot. Herald, 29.

P. hirsuta. Vahl; Hornem. in "Fl. Œcon., 2 ed., 500"; Fl. Dan., 8. **t. 1390**. Seringe, DC. Prodr., 2. 573.

P. Vahliana. Lehm., Monog., 172; Hook., Fl. Bor. Am., 1. 194; Revis., 170, with synonomy. Seemann, Bot. Herald, 51.

P. Jamesoniana. Grev., in "Mem. Soc. Wern., 3. 417, **t. 20**."

P. nivea, var. *γ*. Torr. & Gray, Flora, 1. 441. Durand, Kane's Exped., 2. 453.

Var. macrophylla. Lehm., Nov. Stirp., pug. 9. 57. Seringe, DC. Prodr., 2. 571, omitting syn. Hook., Bot. Mag., **t. 2982**.

P. nivea. R. Br., Parry's 1st Voy., Appx., 277. Lodd., Bot. Cab., **t. 460**.

Var. PROSTRATA. Lehm., Nov. Stirp., pug. 9. 69; Monog., 184; Revis., 169. Seringe, DC. Prodr., 2. 572.

P. prostrata. Rotböll, Skrift., 10. 453.

Var. PENTAPHYLLA. Lehm., Nov. Stirp., pug., 9. 69; Hook., Fl. Bor. Am., 1. 195; Revis., 169.

Var. DISSECTA. — No. 335 Watson, in part.

3. POTENTILLA NORVEGICA. Linn., Spec., 449. Oeder, Fl. Dan., t. 171. Michx., Flora, 1. 302. Ait., Hort. Kew., 2 ed., 3. 279. Nestler, Monog., 66. Elliott, Sketch, 1. 573. Lehm., Monog., 153; Revis., 198, with synonomy. Darlington, Fl. Cestr., 303. Cham. & Schlecht., Linnæa, 2. 26. Hook., Fl. Bor. Am., 1. 193. Bongard, Veg. Sitch., 132. Schlecht., Fl. Lab. in Linn., 10. 98. Torr. & Gray, Flora, 1. 436. Ledeb., Fl. Ross., 2. 36, with synonomy. Gray, Pl. Fendl., 42. Hook., Pl. Geyer in Lond. Jour. Bot., 6. 219. Engelm., Pl. Upp. Miss., 191. Seemann, Bot. Herald, 51. Cooper, Pac. R. R. Rep., 12. 43 and 59. Chapman, Flora, 124. Bourgeau, Palliser's Rep., 256. Gray, Manual, 154. Watson, King's Rep., 5. 85. — No. 205 Fendler; Eschscholtz; Bourgeau; Lyall; Kellogg; Hayden; Howard; and others.

P. Labradorica. Lehm., Ind. Sem. h. Hamb., 1849, Appx., 12; (Ann. Sci. Nat., 3. 12. 355;) Nov. Stirp., pug. 9. 21; Revis., 201. Walpers, Ann., 2. 516.

P. millegrana and *grossa.* Dougl. MS.

Var. HIRSUTA. Torr. & Gray, Flora, 1. 436. Lehm., Nov. Stirp., pug. 9. 75; Revis., 199.

P. Monspeliensis. Linn.; Willd., Spec., 2. 1109.

P. hirsuta. Michx., Flora, 1. 302. Pursh, Flora, 353. Nestler, Monog., 67. Lehm., Monog., 155. Spreng., Syst., 2. 540. Hook., Fl. Bor. Am., 1. 193. Don's Mill., 2. 551.

P. Morisoni. DC., Hort. Monsp., 135. Seringe, DC. Prodr., 2. 573.

26. POTENTILLA PALUSTRIS. Scop., Fl. Carn., 2 ed., 1. 359. Lehm., Monog., 52; Revis., 73, with synonomy. Torrey, Flora U. S., 1. 498. Seringe, DC. Prodr., 2. 583. Meyer, Pl. Lab., 76. Hook., Fl. Bor. Am., 1. 187. Rothrock, Fl. Alaska, 445. Gray, Manual, 155.

Comarum palustre. Linn., Spec., 502. Müll., Fl. Dan., t. 636. Michx., Flora, 1. 302. Pursh, Flora, 156. Nutt., Genera, 1. 311. Richardson, Frankl. Journ., Appx., 2 ed., 12. Bigelow, Fl. Bost., 2 ed., 203. Schlecht., Fl. Lab. in Linn., 10. 98. Torr. & Gray, Flora, 1. 447. Seemann, Bot. Herald, 29. Newberry, Pac. R. R. Rep., 6. 71. Cooper, Pac. R. R. Rep., 12. 59. Hook. f., Distrib. Arc. Pl., 290. Irmisch, in Bot. Zeit., 19. 115. Bourgeau, Palliser's Rep., 256.

P. Comarum. Nestler, Monog., 36. Seringe, DC. Prodr., 2. 583. Cham. & Schlecht., Linn., 2. 25. Bongard, Veg. Sitch., 132.

6. POTENTILLA PENNSYLVANICA. Linn., Mant., 76. Compare synonomy in Ledeb., Fl. Ross., 2. 40, and Lehm., Revis., 57. — Ait., Hort. Kew., 2. 214. Michx., Flora, 1. 304. Pursh, Flora, 356. Nestler, Monog., 36. Lehm., Monog., 55; Hook., Fl. Bor. Am., 1. 187. Torr. & Gray, Flora, 1. 438, excl. vars. δ and ε. Gray, Pl. Fendl., 42. Cooper, Pac. R. R. Rep., 12. 43. Hook. f., Distr. Arc. Pl., 290 and 325 (under *P. sericea*). Bourgeau, Palliser's Rep., 256. Rothrock, Fl.

Alaska, 445. Regel & Herder, Pl. Semenov. in Bull. Soc. Mosc., 1. 474. Gray, Manual, 154. — Nos. 68, 216 Parry; 167 Vasey; Drummond; Nicollet; Burke; Pickering; Greene; Onion, Kinnicott & Hardisty.

P. Missourica. Schrad., Ind. Sem. h. Gött; (Linn., 8, Litt. Ber., 26.) Lindl., Bot. Reg., 17. **t. 1412.** Don's Mill., 2. 557.

Var. STRIGOSA. Pursh, Flora, 356. Lehm., ll. cc. Torr. & Gray, Flora, 1. 438. Engelm., Pl. Upp. Miss., 191. Gray, Am. Jour. Sci., 2. 33. 411; Proc. Phil. Acad., 1863, 61. — No. 162 Hall & Harb.; Nuttall; Bourgeau; Engelmann; Suckley; Kennicott.

P. pectinata. Fisch., MS.

P. holosericea. Nutt., MS., in herb.

P. absinthiifolia and *rubricaulis.* Dougl., MS.

Var. GLABRATA. — No. 326 Watson; Fremont.

P. sericea, var. *glabrata.* Lehm.; Hook., Fl. Bor. Am., 1. 189; Revis., 34. Don's Mill., 2. 560. Torr. & Gray, Flora, 1. 437. Torrey, Fremont's Rep. 89. Seemann, Bot. Herald, 29.

P. Pennsylvanica. Hook & Arn., Bot. Beech., 123.

P. Pennsylvanica, var. *strigosa.* Watson, King's Rep., 5. 86.

Var. ARACHNOIDEA. Lehm., Nov. Stirp., pug. 9. 41; Revis., 59.

P. arachnoidea. Dougl., MS.

P. Pennsylvanica, var. *conferta.* Gray, Pl. Fendl., 42, excl. syn.

Var. BIPINNATIFIDA. Torr. & Gray, Flora, 1. 438. Torrey, Nicollet's Rep., 149. Hook., Pl. Geyer in Lond. Jour. Bot., 6. 220. Lehm., Revis., 60.

P. bipinnatifida. Dougl.; Hook., Fl. Bor. Am., 1. 188. Don's Mill., 2. 558.

P. arguta. Lehm., Monog, 62, excl. syn.; not Pursh. Cham. & Schlecht., Linn., 2. 26. Spreng., Syst., 2. 534.

P. Pennsylvanica, var. *arguta.* Seringe, DC. Prodr., 2. 581.

13. POTENTILLA PLATTENSIS. Nutt.; Torr. & Gray, Flora, 1. 439. Dietr., Syn., 3. 187. Walpers, Rep., 2. 32. Lehm., Revis., 28, **t. 6.** Gray, Proc. Acad. Phil., 1863, 61. — No. 564 Fremont; 161 Hall & Harb.; 331, 332 Watson; 165 Vasey; Nuttall; Bourgeau; Porter; Greene.

P. campestris. Nutt., MS. in herb.

P. sericea, var. *β.* Bourgeau, Palliser's Rep., 256.

? *P. diversifolia,* var. *pinnatisecta.* Watson, King's Rep., 5. 87.

8. POTENTILLA PULCHELLA. R. Br., Ross's Voy., 142; Parry's Voy., Suppl., 277; (Flora, 7. 2, Beilag., 87.) Hook., Parry's 2d Voy., Appx., 395. Lehm., Monog., Suppl., 14. **t. 7**; Nov. Stirp., pug. 3. 25; Hook., Fl. Bor. Am., 1. 191; Revis., 36. Seringe, DC. Prodr., 2. 502. Spreng., Syst., 4. 198. Hornem., Fl. Dan., 13. **t. 2234.** Don's Mill., 2. 586. Torr. & Gray, Flora, 1. 439. Dietr., Syn., 3. 185. Walpers, Rep., 2. 33. Seemann, Bot. Herald, 29. Durand, Kane's Exped., 2. 453. — Parry; Kane; Hayes.

P. sericea. Grev., "Mem. Soc. Wern., 3. 430."

P. Keilhavii. Sommerf., "Fl. Spitz. in Mag. Naturv., 2. 244."

4. POTENTILLA RIVALIS. Nutt.; Torr. & Gray, Flora, 1. 437. Dietr., Syn 3. 178. Walpers, Rep., 2. 31; Ann., 2. 515. Gray, Pl. Fendl., 42. "Otto's Gartenz., 7. 350"; Ind. Sem. h. Hamb., 1851, Add., 10; (Linnæa, 25. 313.) Torrey

Pac. R. R. Rep., 4. 84. Gray, Ives's Rep., 11. Bolander, Cat., 12. — No. 203 Fendler; 173 Vasey; Nuttall; Bigelow; Fitch.

Var. MILLEGRANA. — No. 122 Torrey; 240 Anderson; 1858 Brewer; 324, 325 Watson; 98 Eaton; 169, 173 Vasey; 216 Kell. & Harf.; Cooper.

P. millegrana. Engelm.; Lehm., Ind. Sem. h. Hamb., 1849, Add., 11; (Ann. Sci. Nat., 3. 12. 354); Nov. Stirp., pug. 9. 22; Revis., 202. Walpers, Ann., 2. 517. Watson, King's Rep., 5. 85.

Var. PENTANDRA. — Engelmann.

P. pentandra. Engelm.; Torr. & Gray, Flora, 1. 447. Dietr., Syn., 3. 184. Walpers, Rep., 2. 35. Lehm., Nov. Stirp., pug. 9. 75; Revis., 197, **t. 62**.

5. POTENTILLA SUPINA. Linn., Spec., 497. See synonymy in Ledeb., Fl. Ross., 2. 36, and Lehm., Revis., 193. — Michx., Flora, 1. 304. Pursh, Flora, 1. 356. Torrey, Ann. N. Y. Lyc., 2. 197. Hook., Fl. Bor. Am., 1. 187; Comp. Bot. Mag., 1. 25. Nees, Pl. Neuwied., 8. Maximowicz, Fl. Amur., 97. Bourgeau, Palliser's Rep., 256. — Nuttall; Nicollet; Parry; Engelmann; Culbertson.

P. paradoxa. Nutt.; Torr. & Gray, Flora, 1. 437. Walpers, Rep., 2. 32. Torr., Nicollet's Rep., 149; Bot. Mex. Bound., 64. Gray, Pl. Wright., 1. 68 and 2. 55. Lehm., Nov. Stirp., pug. 9. 74; Revis., 194, **t. 62**. Engelm., Pl. Upp. Miss., 191. Cooper, Pac. R. R. Rep., 12. 43. Paine, Cat. Pl. Oneida, 186. Gray, Manual, 154.

Var. NICOLLETII. — 361 Nicollet.

27. POTENTILLA THURBERI. Gray, Pl. Thurb., 318. Lehm., Ind. Sem. h. Hamb., 1854, 10; (Ann. Sci. Nat., 4. 2. 376 ;) "Otto's Gartenz., 10. 459"; Revis., 92. Torrey, Bot. Mex. Bound., 64. Müller, Ann., 7. 868. — No. 1107 Thurber; 347 Bigelow; Henry.

30. POTENTILLA TRIDENTATA. Aiton, Hort. Kew., 2. 216, **t. 9**. Vahl, Symb. Bot., 2. 59. Michx., Flora, 1. 302. Nestler, Monog., 66. Lehm., Monog., 190; Hook., Fl. Bor. Am., 1. 195; Revis., 22. Richardson, Frankl. Journ., Appx., 12. Torrey, Flora U. S., 1. 495. Seringe, DC. Prodr., 2. 585. Spreng., Syst., 2. 514. Don's Mill., 2. 552. Torr. & Gray, Flora, 1. 445. Hook. f., in Journ. Linn. Soc., 5. 83. Durand, Kane's Exped., 2. 454. Chapman, Flora, 124. Bourgeau, Palliser's Rep., 256. Matthews, Fl. Acad., 15. Gray, Manual, 124.

P. retusa. Müll., Fl. Dan., 5. **t. 799**. Retz, Fl. Scand., 2 ed., 123. Hornem., Fl. Dan., 11. **t. 1875**. Don's Mill., 2. 550.

Cross-References.

P. absinthiifolia = P. Pennsylvanica, var.
P. arachnoidea. = P. Pennsylvanica.
P. arguta; P. glandulosa; P. Pennsylvanica.
P. aurea; P. maculata.
P. Bigelowiana = P. arguta.
P. bipinnatifida = P. Pennsylvanica, var.
P. Blaschkeana = P. gracilis.
P. campestris = P. Plattensis.
P. Caroliniana = P. Canadensis.
P. chrysantha = P. gracilis, var.
P. Comarum = P. palustris.
P. concinna; P. gracilis.
P. confertiflora = P. arguta.
P. crocea; P. maculata.
P. dealbata = P. Hippiana.
P. depauperata = Ivesia depauperata.
P. diffusa; P. Hippiana.

P. diversifolia; P. dissecta; P. Plattensis.
P. Drummondii = P. dissecta.
P. Egedii = P. Anserina, var.
P. fastigiata; P. gracilis.
P. ferruginea = P. arguta.
P. fissa = P. glandulosa.
P. flabellifolia = P. gelida.
P. flabelliformis = P. gracilis, var.
P. floribunda = P. fruticosa.
P. frigida = P. emarginata.
P. glaucophylla = P. dissecta, var.
P. glutinosa = P. glandulosa.
P. gossypina = P. effusa.
P. Grœnlandica = P. emarginata.
P. grossa = P. Norvegica.
P. hirsuta; P. nivea; P. Norvegica.
P. holosericea = P. Pennsylvanica, var.
P. Jamesoniana = P. nivea, var.
P. Keilhavii = P. pulchella.
P. Labradorica = P. Norvegica.
P. leucochroa = P. fragiformis, var.
P. leucophylla = P. Hippiana.
P. lucida = P. fragiformis, var.
P. millegrana; P. Norvegica; P. rivalis.
P. minima; P. frigida.
P. Missourica = P. Pennsylvanica.
P. Monspeliensis = P. Norvegica.
P. Morisoni = P. Norvegica.
P. multijuga = Horkelia Californica, var.
P. nana = P. emarginata.
P. Newberryi = Ivesia gracilis.
P. nivalis, Torr. = Geum Rossii.
P. nivea; P. emarginata; P. gracilis.
P. Nuttallii = P. gracilis, var.
P. olopetala = P. gracilis, var.
P. opaca; P. maculata.
P. Oregana = P. glandulosa.
P. paradoxa = P. supina.
P. pectinata = P. Pennsylvanica, var.
P. Pennsylvanica; P. arguta; P. Hippiana.
P. pentandra = P. rivalis, var.
P. procumbens; P. nemoralis.
P. prostrata; P. nivea.
P. pulchella; P. humifusa.
P. pulcherrima = P. gracilis, var.
P. pumila = P. Canadensis.
P. recta; P. gracilis.
P. retusa = P. tridentata.
P. rigida; P. gracilis, var.
P. Robbinsiana = P. frigida.
P. rubricaulis; P. dissecta; P. Hippiana; P. Pennsylvanica.
P. rupestris = P. glandulosa.
P. Salisburgensis = P. maculata.
P. sarmentosa = P. Canadensis.
P. sericea; P. Pennsylvanica; P. Plattensis; P. pulchella.
P. simplex = P. Canadensis, var.
P. Tormentilla = P. nemoralis.
P. Vahliana = P. nivea, var.
P. verna; P. emarginata.
P. villosa = P. fragiformis, var.
P. Wrangelliana = P. glandulosa.

Revision of the extra-tropical North American Species of the Genus Œnothera. — By SERENO WATSON.

The limits of this genus are retained as defined in Torrey & Gray's Flora, and by Bentham & Hooker, though *Godetia* and *Boisduvalia* might be removed from it with apparent safety. These sections are more nearly allied to *Clarkia* and *Eucharidion*, and are characterized by a similar attachment of the anthers to the filament by a broad and somewhat cordate base, by the same purple or lilac color of the petals, which in some species become strongly lobed, and (in *Godetia*) by the unusually uniform shape of the seeds, which resemble those of the two genera mentioned. In *Boisduvalia* we have also the calyx-lobes never reflexed, and the capsule few-seeded. The supposed affinity, however, of *Godetia* to *Epilobium*, on account of the analogy of the crest upon the seed of the one to the coma in the other, as held by Spach and admitted by Lindley, can scarcely be sustained.

A few new species are added, and some that had been reduced are restored; but the total number is little larger than that given by Torrey & Gray.

Synopsis of Species.

§ 1. EUŒNOTHERA. Stigma-lobes linear, elongated (very short in *Œ. linifolia*); calyx-tube linear, slightly dilated at the throat; petals never lilac or purple; filaments nearly equal; anthers linear, attached at the middle.

* Annual or biennial, caulescent; flowers erect before opening, yellow, the calyx tips free; capsules sessile, coriaceous, straight or nearly so; seeds in two rows in each cell.

† Flowers in a leafy spike; capsules oblong, slightly attenuate above; seed with more or less margined angles, nearly smooth.

Rather stout, erect, 1 - 5° high, usually simple; calyx-tube 1 - 2½' long; capsule ¾ - 1' long . . . . . . 1. *Œ. biennis.*

Thick and woody at base, 5 - 10° high; calyx-tube 3 - 5' long; capsule 1 - 2' long . . . . 2. *Œ. Jamesii.*

† † Flowers in a leafy spike; capsule linear; seeds not margined, minutely tuberculate.

Spike rather loose and few-flowered; calyx sparingly villous; petals roundish . . . . 3. *Œ. heterophylla.*

Spike elongated, dense; calyx silky-canescent; petals rhombic-ovate . . . . 4. *Œ. rhombipetala.*

† † † Flowers axillary; capsules linear.

Pubescence dense, short, appressed; leaves ¼ - 1' long; capsule ½ - 1' long, silky; seeds smooth; fls. small . 5. *Œ. humifusa.*

Pubescence longer and more spreading on the calyx and ovary; lvs. ½ - 2½' long; capsule 1 - 2' long; seeds obscurely pitted; fls. large . . . . 6. *Œ. Drummondii.*

More or less strigose-pubescent, calyx and ovary subvillous; capsule 1 - 1½' long; seeds strongly pitted . . 7. *Œ. sinuata.*

* * Annual or perennial, caulescent; flowers nodding in the bud, white turning rose-color; capsules sessile, mostly linear; seeds in a single row.

Annual or biennial; calyx-tips not free, throat naked; seeds oval, not angled, finely pitted . . . . . 8. *Œ. pinnatifida.*

Annual; calyx very villous; the tips not free, throat naked; seeds smooth, lance-linear . . . . . 9. *Œ. trichocalyx.*

Perennial; calyx-tips free, throat naked; seeds smooth, lance-linear . . . . 10. *Œ. albicaulis.*

Perennial; calyx-tips short, free, throat very villous; capsule oblong; seeds ovate, angled, tuberculate . . 11. *Œ. coronopifolia.*

* * * Annual to perennial, caulescent; capsules obovate or clavate, often pedicelled, quadrangular, the valves ribbed and the angles more or less strongly winged (except in *Œ. linifolia*).

† Flowers yellow, erect in the bud.

Leaves linear-filiform, numerous; petals 1 – 3″ long; stigmas short; capsules 2 – 3″ long, sessile . . . . 12. *Œ. linifolia.*

Leaves linear to oblanceolate, entire; fls. axillary, small; capsules pubescent, nearly sessile, slightly winged; Texan . . . . 13. *Œ. Spachiana.*

Leaves narrowly oblanceolate, entire; fls. loosely spiked, small; capsule glabrous, sessile or shortly pedicelled, slightly winged . . . . 14. *Œ. pumila*

Leaves ovate to linear, mostly denticulate; fls. subcorymbed, mostly ½ – 1′ long; capsule strongly winged, subsessile or short pedicelled . . . . . . 15. *Œ. fruticosa.*

Glabrous, subglaucous; leaves ovate to ovate-oblong; fls. larger, corymbose; capsule very broadly winged . . 16. *Œ. glauca.*

† † Flowers white or purple, nodding in the bud.

Calyx-tube as long as the ovary; petals white, large, obcordate . . . . 17. *Œ. speciosa.*

Calyx-tube shorter than the ovary; petals purple, small, entire . . . . 18. *Œ. rosea.*

* * * * Acaulescent or nearly so; flowers white or rose-color, erect in the bud; capsule ovate or ovate-oblong, obtusely or sharply angled, mostly sessile, large and rigid.

Capsule oblong, ribbed, often doubly crested on the angles; calyx-tube 2 – 7′ long; petals ¾ - 1¾′ long . . . 19. *Œ. cæspitosa.*

Capsule ovoid-conical, not crested, scarcely angled, net-veined; calyx-tube 1 –2′ long; petals 4 – 9″ long . 20. *Œ. primiveris.*

Capsule ovate, persistent, strongly winged, net-veined; calyx-tips free, the tube 2 – 4′ long; petals ½ – 1′ long . 21. *Œ. triloba.*

Capsule ovate, winged, more or less corky, smooth; calyx-tube 2 – 4′ long; petals 1½′ long, purplish; seed-testa thickened . . . . 22. *Œ. brachycarpa.*

Capsule 1 – 1½′ long, more attenuate upward, smooth, not corky; seed-testa not thickened . . . . . . 23. *Œ. Wrightii.*

* * * * * Caulescent perennials; flowers axillary, yellow except in *Œ. canescens*, calyx slightly dilated; capsule ovate to orbicular, strongly angled or broadly winged.

Low; capsule ovate, 3 – 4″ long, angled; petals white and rose-color, 6″ long; calyx-tube 6 – 8″ long . . . 24. *Œ. canescens.*

Low; capsule very silky, 8″ long, very broadly winged; calyx-tube 1 – 2′ long; petals ½ – 1′ long; seed not crested . . . . 25. *Œ. Fremontii.*

Capsule 1 – 3′ long, with wings nearly as broad; calyx-tube 2 – 5′ long; petals 1 – 2½′ long; seeds strongly crested . . . . 26. *Œ. Missouriensis.*

Glabrous; leaves ciliate, entire; calyx-tube 4 – 5′ long; petals 1 – 1½′ long . . . . 27. *Œ. microsceles.*

§ 2. TARAXIA. Stigma capitate; calyx-tube filiform, persistent; anthers attached at the middle, oblong; capsules sessile, linear to ovate, winged above in *Œ. graciliflora;* seeds in two rows. Mostly perennial and acaulescent; flowers yellow, erect in the bud.

Subpubescent; lvs. deeply pinnatifid; calyx-tube 3 – 6″ long; petals 3″ long . . . . 28. *Œ. breviflora.*

More densely pubescent; lvs. deeply pinnatifid; calyx-tube 1 – 2½′ long; petals 5 – 7″ long . . . . 29. *Œ. Nuttalli.*

Glabrous; leaves lanceolate, nearly entire; calyx-tube 1 – 3′ long . . . . 30. *Œ. heterantha.*

Subpubescent; leaves often ovate, ciliate; filaments nearly equal; calyx-tube 1 – 4′ long . . . . . . 31. *Œ. ovata.*

Annual, small, hirsute; leaves linear, ciliate; calyx-tube ½ – 1½′ long; capsule truncately winged above, 5″ long . 32. *Œ. graciliflora.*

§ 3. MERIOLIX. Stigma discoid; calyx-tube more broadly dilated above; anthers oblong-linear, attached at the middle; capsule mostly sessile, linear-cylindric. Mostly perennial, somewhat woody, with axillary yellow flowers, erect in the bud.

Leaves numerous, linear to lanceolate, mostly entire; calyx-tube 1 – 2′ long, the tips free and linear; petals 4 – 12″ long; capsule 8 – 10″ long . . . . . 33. *Œ. Hartwegi.*

Shrubby and diffuse; lvs. ovate to oblong, 1 – 3″ long; fls. smaller; capsules ½′ long . . . . . . 34. *Œ. Greggii.*

Leaves linear to oblong-lanceolate, entire; calyx-tube 4 – 7″ long, the free tips short; petals 4 – 5″ long; capsules 4 – 7″ long, subpedicellate . . . . 35. *Œ. tubicula.*

Leaves linear to lanceolate, denticulate; the free calyx-tips short; capsules 9 – 15″ long . . . . 36. *Œ. serrulata.*

§ 4. SPHÆROSTIGMA. Stigma capitate; calyx-tube obconic or short-funnelform; anthers oblong, attached at the middle; capsule linear, sessile, attenuated above, curved and contorted. Annuals or biennials, with usually crowded bracteate or leafy spikes.

* Flowers white or rose-colored, in a nodding spike; capsule narrowly linear, terete, much contorted.

Canescently puberulent; leaves oblanceolate or oblong-lanceolate, entire or nearly so; capsule 8 – 12″ long, very slender, scarcely thicker at base . . . . . 37. *Œ. alyssoides.*

Viscidly pubescent; leaves ovate, short-petioled, denticulate; capsule 6 – 9″ long, linear-fusiform . . . 38. *Œ. Boothii.*

Glabrous; spike nearly erect; leaves lanceolate or narrowly oblanceolate, usually denticulate; capsule 8 – 15″ long, linear-fusiform . . . . 39. *Œ. gauræflora.*

* * Flowers yellow, turning green; stems leafy throughout; capsules linear, tetragonal, more or less contorted.

Canescently pubescent or rarely glabrous; lvs. thick, mostly entire; capsules 4 – 8″ long; maritime . 40. *Œ. cheiranthifolia.*

Somewhat hirsute; leaves denticulate; petals 4 – 7″ long, capsules $\frac{1}{2}$ – $1\frac{1}{2}$′ long . . . . 41. *Œ. bistortia.*

Somewhat hirsute; petals 1 – 2″ long; capsules 8 – 15″ long . . . . 42. *Œ. micrantha.*

* * * Flowers small, yellow, usually turning red; capsule very narrowly linear, subterete, slightly curved.

Subviscidly puberulent; leaves lanceolate; petals 1″ long . . . . 43. *Œ. chamænerioides.*

More or less hirsute; leaves linear; petals 2 – 4″ long, rarely reddening; capsules narrowly beaked . . 44. *Œ. dentata.*

Appressed puberulent or hirsute; leaves linear or lanceolate; petals 1 – 2″ long, usually reddening; capsules scarcely beaked, often short-pedicelled . . . . . 45. *Œ. strigulosa.*

* * * * Dwarf; flowers yellow, minute; capsule fusiform.

Canescently puberulent; capsules 3 – 6″ long . . 46. *Œ. andina.*

§ 5. CHYLISMIA. As in § 4, but capsules linear to clavate, pedicelled and obtuse; caulescent annuals.

* Racemes loose, naked, mostly few-flowered; seeds oblong-lanceolate.

Puberulent or nearly glabrous; leaves low on the stem, usually lyrately pinnatifid; calyx-tips not free; capsule 4 – 12″ long . . . . 47. *Œ. scapoidea.*

Villous, not puberulent; leaves the same; calyx-tips free, thick; capsules 1 – 3′ long . . . . 48. *Œ. brevipes.*

Canescently hirsute; leaves scattered, simple, cordate or ovate; capsules short-pedicelled . . . . . 49. *Œ. cardiophylla.*

Glabrous; leaves pinnate with many nearly equal leaflets; calyx-tube very short, tips not free . . . . . 50. *Œ. multijuga.*

* * Flowers leafy-bracted, very small; seeds oblong, deeply concave on the inner side.

Dwarf, few-flowered, somewhat hispid . . . . . 51. *Œ. pterosperma.*

§ 6. GODETIA. Stigma-lobes short, linear to ovate; calyx-tube obconic or short-funnelform; petals purple to rose-color; anthers oblong, fixed near the base, the petaline filaments shortest; capsule ovate to linear; seeds in one row, horizontal, angled, crested above.

* Capsule ovate to oblong, sessile; stems leafy; flowers in a strict mostly compact spike, erect in the bud.

Fls. crowded, large; petals 1 – 2′ long; stigmas linear; capsule 8 – 15″ long, short-pubescent, not costate . . 52. *Œ. grandiflora.*

Fls. mostly in a terminal cluster; petals 4 – 6″ long; stigma-lobes very short; capsule 6 – 9″ long, hairy, not costate . . . . 53. *Œ. purpurea.*

Fls. in a short simple spike; petals 3 – 12″ long; stigma-lobes very short; capsule bicostate upon at least the alternate sides . . . . 54. *Œ. lepida.*

Fls. small in numerous lateral spikelets, mostly in a crowded compound spike; capsule with at least the alternate sides bicostate, 3 – 6″ long . . . . 55. *Œ. albescens.*

* * Capsule linear; flowers scattered in a loose slender spike or raceme, nodding in the bud; stems less leafy.

† Capsules sessile.

Calyx villous, tube funnelform, tips free; capsules 8-costate, puberulent; stigma yellow . . . . . . 56. *Œ. Williamsoni.*

Ovary and capsule hairy; capsule mostly short, not costate; petals 3 – 6″ long; stigma yellow . . 57. *Œ. quadrivulnera.*

Capsule puberulent, 8 – 12″ long, not costate, petals 3 – 5″ long; stigma purple . . . . 58. *Œ. tenella.*

Stouter; petals 9 – 12″ long; capsule 8-costate, smoothish . . . . 59. *Œ. viminea.*

Ovary densely pubescent; style not exserted from the calyx-tube; filaments short; capsule with prominent sutures . . . . 60. *Œ. Romanzovii.*

† † Capsule pedicelled, not costate; stigma mostly yellow.

Capsule 1 – 1½′ long, attenuate each way; petals 8 – 15″ long; anthers purple; stigma-lobes 1½″ long . . 61. *Œ. amœna.*

Subglabrous; capsule 10 – 15″ long, long-pedicelled; petals 6 – 12″ long; stigma-lobes short; lvs. often repand-dentate; S. California . . . . 62. *Œ. Bottæ.*

Tomentosely puberulent; capsule 6 – 14″ long, short-pedicelled; petals 3 – 6″ long; stigma-lobes short . 63. *Œ. epilobioides.*

Calyx and ovary glandularly pubescent; capsule 4 – 9″ long, abrupt at base; stigma-lobes linear . . . . 64. *Œ. hispidula.*

Puberulent; capsule abrupt at base, short-pedicelled; petals 2-lobed . . . . 65. *Œ. biloba.*

§ 7. BOISDUVALIA. Stigma-lobes short; calyx funnelform, the segments erect; petals 2-lobed, small, purple to white; anthers short; capsule ovate-oblong to linear-cylindric, nearly terete, thin, erect, sessile; seeds few, smooth, ovate-oblong; erect annuals.

Spike usually close and compound; floral bracts usually unlike the leaves; petals 3 – 6″ long; capsule ovate-oblong, 2 – 4″ long; seeds 1″ long; placenta large . 66. *Œ. densiflora.*

Spike simple; floral and cauline leaves similar; fls. very small; capsule linear, 4 – 6″ long; seeds smaller . . 67. *Œ. Torreyi.*

Glabrous; spike simple; leaves uniform; capsules ovate-oblong, 2 – 4″ long; placenta narrow . . . . 68. *Œ. glabella.*

§ 1. EUŒNOTHERA, Torr. & Gray. Lobes of the stigma linear, mostly elongated; tube of the calyx linear, slightly dilated at the throat; petals mostly flabelliform, obcordate or obovate, never lilac or purple; filaments nearly equal, often declined; anthers linear or linear-oblong, attached at the middle, versatile.

* Annual or biennial caulescent herbs; flowers erect before opening, yellow, usually turning to rose-color, nocturnal; tips of the calyx-segments free in the bud; capsule sessile, coriaceous, straight or nearly so, subtetragonal, the valves somewhat ribbed; seeds in two rows in each cell. — *Onagra*, Tourn.

† Flowers in a leafy spike; capsule stout, oblong, slightly tapering above; seeds oblong, angled, nearly smooth, the angles more or less margined.

1. Œ. BIENNIS, L. Erect, usually stout and mostly simple, 1 – 5° high, canescently puberulent and more or less hirsute or strigose; leaves lanceolate to oblong- or rarely ovate-lanceolate, 2 – 6′ long, acute or acuminate, repandly denticulate, the lowest petioled; calyx-tube rather slender, 1 – 2½′ long; petals ½ – ¾′ long; capsule more or less pubescent or hirsute, 3″ broad, 9 – 12″ long; seeds nearly 1″ long. — From lat. 56° to the Gulf, Texas, Nevada, and Oregon. The more strigose form is *Œ. muricata*, Murr.; the more softly pubescent is *Œ. Oakesiana.* The hairs often arise from a purple base.

Var. GRANDIFLORA, Lindl. Petals equalling the calyx-tube, 1 – 2½′ long. — Of equal range, but less common eastward. The broader leaved form is *Œ. Lamarckiana*, Ser.

Var. HIRSUTISSIMA, Gray. (*Œ. Hookeri*, Torr. & Gray.) Resembling var. *grandiflora*, but more hirsute, especially upon the ovary. — From New Mexico to California.

Var. CRUCIATA, Torr. & Gray. Flowers small, the petals very narrow or wholly wanting. An eastern form.

2. Œ. JAMESII, Torr. & Gray. Resembling the last, but much stouter and larger flowered. Stem 5 – 10° high, becoming thick and woody at base; pubescence appressed, canescently puberulent, with scattered substrigose hairs; spike becoming rather loose; calyx-tube rather thick, 3 – 5′ long; petals very broad, 1½ – 2½′ long; capsule 1 – 2′ long.

— On stream banks, from Western Texas to Southern Utah and Eastern Arizona.

† † Flowers in a leafy spike; capsule linear, ¾ – 1′ long, 1 – 1½″, thick; seeds oblong, the angles not margined, minutely tuberculate. Erect, 1 – 2° high; leaves 2 – 3′ long; calyx-tube slender, 1 – 1½′ long.

3. Œ. HETEROPHYLLA, Spach. (*Œ. bifrons*, Don.) Often branched above; pubescence usually sparse, strigose or hirsute, mostly subappressed; leaves lanceolate, acute, the lower attenuate at base, and occasionally sinuate-pinnatifid, the upper repand-denticulate, the uppermost oblong- to ovate-lanceolate, or subcordate; spike rather loose and few-flowered; calyx villous with scattered, spreading hairs; petals 8 – 12′ long, roundish, obtuse or subacute. — Texas.

4. Œ. RHOMBIPETALA, Nutt. Rarely branching, appressed-puberulent and subcanescent; leaves narrowly lanceolate, acuminate, denticulate, the lowest attenuate to a petiole and rarely pinnatifid, diminishing upwards into the close, elongated, conspicuously bracted spike, the uppermost often subcordate; calyx-tube very slender, the segments canescent with short, close, appressed hairs; petals rhombic-ovate, 6 – 10″ long, acute or acutish; filaments and elongated style filiform. — From Illinois to Minnesota, Kansas, and the Indian Territory.

† † † Flowers axillary; capsules linear, 1 – 1½″ thick.

5. Œ. HUMIFUSA, Nutt. Stems decumbent or ascending, ½ – 2° long; pubescence dense, canescent, short, appressed; leaves narrowly lanceolate or oblanceolate, ¼ – 1′ long, acute, sparingly repand-dentate or entire, the radical leaves pinnatifid; calyx-tube 1′ long or more, two to three times longer than the petals, the free tips of the segments short; capsule ½ – 1′ long, silky; seeds oblong, somewhat angular, smooth. — On the sea-coast from Cape May to Cape Florida.

6. Œ. DRUMMONDII, Hook. Stems decumbent or ascending, 1 – 2° long, simple or branched; pubescence more or less dense, short, strigose, appressed, longer and more spreading on the calyx and ovary; leaves oblong-lanceolate or oblanceolate, ½ – 2½′ long, acute, attenuate to the base, entire or sparingly repand-denticulate, or subsinuate-toothed at base; calyx-tube 1 – 2′ long, rather thick, equalling or a little exceeding the petals; capsule 1 – 2¼′ long; seeds oblong or oval, very obscurely angled and obscurely pitted. — Coast of Texas. 35 *xantus*, a densely white-tomentose specimen from Cape St. Lucas, Lower Cali-

fornia, is perhaps to be referred here, rather than to *Œ. humifusa*, having the larger flower and elongated capsule, but with a larger, erect seed (¾″ long), very nearly smooth, and the calyx and ovary not villous.

7. Œ. SINUATA, L. Stems ascending or decumbent, simple or branched, about 1° high or more; more or less strigose-pubescent and puberulent; leaves oblong or lanceolate, 1 – 2′ long, sinuately toothed or often pinnatifid, the lower petioled; calyx and ovary subvillous, the slender tube ¾ – 1½′ long; petals 6 – 9″ long; capsule 1 – 1½′ long; seeds oblong, subangled, strongly pitted. — From New Jersey to Florida, the Indian Territory, Texas, and Mexico; Peru. *Œ. laciniata*, Hill, is the older name, but less appropriate. *Œ. prostrata*, Ruiz & Pav., is the same.

Var. MINIMA, Nutt., is a slender, reduced form, 1-flowered, often nearly glabrous.

Var. HIRSUTA, Torr. & Gray. Densely hirsute, with appressed and spreading hairs; seeds less strongly pitted.

Var. GRANDIFLORA. Flowers larger, the petals 1 – 1¼′ long; stems often decumbent. — Texas. Distinguished from *Œ. pinnatifida* by the yellow flowers erect before opening, the free calyx-tips, and the more oblong and angled seeds.

* * Annual or perennial caulescent herbs; flowers axillary, mostly large, nodding in the bud, white becoming rose-color, diurnal; capsules mostly linear, subtetragonal, sessile; seeds ascending in a single row in each cell. — *Anogra*, Spach.

8. Œ. PINNATIFIDA, Nutt. Annual or biennial; stem decumbent at base and diffusely branched, or subsimple and erect, 3 – 12′ high; canescently puberulent or subhirsute; leaves oblanceolate or linear-lanceolate, 1 – 3′ long, mostly deeply sinuate-pinnatifid with linear lobes, the lower spatulate and long-petioled, less deeply pinnatifid or entire; calyx-tube rather slender, equalling or a little shorter than the petals, the segments subvillous, tips not free, throat naked; petals emarginate, ¾ – 1¼′ long; capsules linear, 1 – 1½′ long, 1 – 1½″ wide, submembranous, more or less puberulent, erect or curved; seeds oval, apiculate, not angled, finely pitted. — East of the Rocky Mts., from Dakotah to the Indian Territory and New Mexico; Sonora.

9. Œ. TRICHOCALYX, Nutt. Annual; stem mostly stout, ½ – 1° high, erect or decumbent at base, simple or branched, white and shining; glabrous or canescently puberulent or subvillous; leaves linear to

oblong-lanceolate or rhomboidal, 2 – 4′ long, acute or acuminate, attenuate into a long petiole, repandly denticulate or sinuate-pinnatifid with irregularly unequal segments, or the lowest entire; calyx very villous, the bud obtuse, the tube slender, ½ – 1½′ long, throat naked; petals about equalling the tube, very broad, entire or deeply sinused; capsule linear, tapering upward, 1 – 2′ long, 1 – 3″ thick at the rigid and often contorted base; seeds lance-linear, smooth, ¾″ long, subangled. — From Western Wyoming to N. Eastern California, and on the eastern side of the Sierra to Arizona and New Mexico.

10. Œ. ALBICAULIS, Nutt. Stems from a perennial subterranean rootstock, erect, ½ – 4° high, simple or branched, white and often shreddy; glabrous or puberulent; leaves linear to oblong-lanceolate, 1 – 3′ long, sessile or attenuate at base or abruptly petioled, entire or repand-denticulate, or sinuate-pinnatifid toward the base; calyx with the tips of the segments free, the tube rather slender, ¾ – 1′ long, throat naked; petals equalling or somewhat shorter than the tube, suborbicular, entire or emarginate; capsule and seed as in the last. — A very variable species. From the Saskatchewan to Washington Territory, and eastward of the Sierra to Sonora and New Mexico.

Var. RUNCINATA, Engelm. Canescently puberulent, erect, diffusely branched; leaves narrowly lanceolate, coarsely dentate or sinuately pinnatifid the whole length. — New Mexico.

Var. CALIFORNICA. Weak and decumbent, densely hoary-pubescent with short, appressed, strigose hairs, and more or less villous; leaves lanceolate, repand-denticulate or sinuate-pinnatifid; flowers large, 2 – 3′ in diameter. — California; not collected in fruit, and perhaps distinct.

Var. BREVIFOLIA, Engelm. Very glabrous, erect, much branched; leaves broadly ovate, sessile, coarsely dentate, acutish or obtuse, 4 – 6″ long, dark green. — Collected only by Wislizenus (99) on sand-hills, south of El Paso in New Mexico.

Var. TRICHOCALYX, Engelm. Canescently hirsute, erect, sparingly branched; leaves lanceolate or lance-oblong, sessile, with a broad, truncate base, sinuate-dentate. — Also collected only by Wislizenus (473) at Las Vegas in New Mexico.

11. Œ. CORONOPIFOLIA, Torr. & Gray. Stems from a perennial subterranean rootstock, erect, ½ – 1½° high, branched; canescently puberulent, often more or less hispid; leaves narrowly oblanceolate, 1 – 2′ long, sinuately pinnatifid or more usually pectinate-pinnatifid, the linear

segments as broad as the rachis; calyx-segments with short, free tips, the tube ½′ long, with the throat densely villous; petals 4 – 8″ long; capsule oblong or linear-oblong, pubescent, 3 – 9″ long, 2″ or more broad; seeds large, ovate and angled, tuberculate-costate, subapiculate, ¾″ long. — From Nebraska to the Uintas, and southward to New Mexico.

* * * Annual to perennial caulescent herbs; flowers "mostly diurnal"; calyx-tube linear, the throat a little expanded; capsule obovate or clavate, often pedicelled, quadrangular, the ribs prominent, and the angles more or less prominently winged (except in *Œ. linifolia*), rather cartilaginous and rigid, the dissepiments often evanescent; seeds in double rows, small, oblong, angled. — *Œnotherium*, Seringe.

† Flowers yellow, erect in the bud. — *Kneiffia*, Spach.

12. Œ. LINIFOLIA, Michx. Annual or biennial, erect, very slender, simple or diffuse, 6 – 15′ high, glabrous, the branchlets and capsules puberulent; radical leaves oblanceolate, the cauline linear-filiform, ½ – 1′ long, numerous and fascicled; spike loosely flowered, the bracts short, ovate to lanceolate; calyx-tube ½ – 1″ long, slender, shorter than the ovary; petals 1 – 3″ long; stigmas short; capsules sessile, obovate, obtuse, 2 – 3″ long, not winged; seeds smooth. — From the Indian Territory to Louisiana and Texas.

13. Œ. SPACHIANA, Torr. & Gray. Annual, erect, simple or branched, 6 – 15′ high, puberulent; leaves linear to oblanceolate, 1 – 2′ long, obtuse, entire; flowers axillary; calyx-tube 3 – 4″ long, nearly equalling the petals; capsules pubescent, 5 – 7″ long, obovate-clavate, with a slender base, prominently ribbed, slightly winged towards the apex; seeds smooth. — Texas.

14. Œ. PUMILA, L. Closely resembling the last. Biennial, puberulent; stems ascending, 1 – 2° high; leaves mostly glabrous, entire, the radical spatulate, the cauline narrowly oblanceolate; spike loose, leafy; capsule glabrous, sessile or on a short pedicel. — From New England and Canada to the Saskatchewan, and southward to New Jersey, "and in the mountains to Georgia." *Œ. chrysantha* must be referred here.

15. Œ. FRUTICOSA, L. Biennial or perennial, erect, simple or branching above, often tall and rather stout, 1 – 3° high, villous-pubescent, puberulent or nearly glabrous; leaves ovate to narrowly lanceolate, 1 – 3′ long, usually acute, mostly repandly denticulate, sessile

or shortly petioled; flowers in close, repeated, leafy corymbs, or in a loose raceme; bracts linear; calyx-tube slender, 5 – 12″ long; petals ¾ – 1′ long; capsule obovate to clavate-oblong, 2 – 5″ long, more or less attenuate to the base, subsessile or with a pedicel shorter than the capsule, prominently ribbed and strongly winged, glabrous or pubescent, seeds very minutely tuberculate. — From Canada to Illinois, and southward to Florida and Louisiana. Very variable in the amount and character of the pubescence, in foliage, inflorescence, and size of the flowers.

Var. AMBIGUA, Torr. & Gray, may perhaps be distinguished as a smaller flowered form, the petals 2 – 8″ long, and with narrower lanceolate to linear leaves.

Var. LINEARIS. (*Œ. linearis*, Michx.) Rather sparsely pubescent or shortly villous; leaves linear to narrowly lanceolate, remotely repand-denticulate or entire; capsule about equalling or usually shorter than the pedicel, pubescent or glabrous, rather less broadly winged. — Atlantic States, from Connecticut to Florida and Louisiana. It seems impossible to maintain this as a distinct species.

To this must also be referred *Œ. riparia*, Nutt., with nearly glabrous, obscurely denticulate leaves, slightly hairy only on the margin and veins, as occasionally occurs in the typical form of the species. In Nuttall's original specimens the capsules are exactly as in *Œ. fruticosa*, and short-pedicelled. In other specimens the length of the pedicel is quite variable.

Var. HUMIFUSA, Allen. Perennial, low, decumbent or ascending, somewhat woody at base, diffusely branched, minutely appressed-pubescent; branches slender, flexuous; leaves linear to oblanceolate, ½ – 1½′ long; petals 4 – 8″ long; capsules pubescent, about equalling the pedicel. — Suffolk County, Long Island. A remarkable form, strongly marked in its habit.

16. Œ. GLAUCA, Michx. Perennial, erect, 2 – 3° high, branching above, glabrous, subglaucous; leaves ovate to ovate-oblong, 2 – 4′ long, acute or obtusish, sessile, repand-denticulate; flowers in short, leafy corymbs; calyx-tube 6 – 10″ long; petals 9 – 15″ long, emarginate; capsule glabrous, ovoid-oblong, 4 – 5″ long, very broadly winged, usually very abruptly attenuate into a pedicel, equalling or shorter than the capsule. — In the mountains of Virginia and Kentucky, and southward to Northern Alabama.

† † Flowers white or purple, nodding in the bud, few in a loose

spike; capsule clavate-obovate, strongly 8-ribbed, rigid, sessile.— *Xylopleurum*, Spach.

17. Œ. SPECIOSA, Nutt. Stems from a perennial subterranean rootstock, erect or ascending, or subdecumbent, ½ – 2° high, branching; puberulent or canescently pubescent, rarely subvillous; leaves oblong-lanceolate to linear, 1 – 4′ long, acute, attenuate at base, repand-denticulate, sinuate-dentate, or more or less deeply sinuate-pinnatifid, especially at base, or the lower lyrately pinnatifid; calyx-tube rather thick, 4 – 8″ long, a little exceeding the ovary; petals ¾ – 1½′ long, white or rose-color, broadly obcordate or emarginate; capsule 7 – 9″ long, acute above, attenuate below into a terete or subangled base of half its length, nearly equally 8-costate by the thickened angles and prominent ribs; seeds very small, angled, scarcely tuberculate under a strong microscope. — From Kansas to Southern Texas.

18. Œ. ROSEA, Ait. Biennial or perennial, puberulent; stems ascending, 1 – 2° high, branching from the base; leaves lanceolate, 1 – 2′ long, acute or acuminate, attenuate to a petiole, repandly denticulate or entire, frequently sinuate-pinnatifid toward the base; calyx-tube slender, 2 – 4″ long, shorter than the ovary; petals purple or rose-color, about equalling the tube, rounded, entire; capsule as in the last, but seeds smoother. — From New Mexico and Arizona to Mexico; Peru.

* * * * Acaulescent or nearly so, mostly perennial; flowers axillary, erect in the bud, white or rose-color; calyx-tube elongated, somewhat dilated at the throat; capsule ovate or ovate-oblong, large and rigid, obtusely tetragonal or sharply angled, mostly sessile; seeds large, horizontal. — *Pachylophis* (and *Lavauxia* in part), Spach.

19. Œ. CÆSPITOSA, Nutt. Biennial or perennial, acaulescent or with a suberect stem, 2 – 6′ high, glabrous or more or less villous with spreading, subscabrous hairs; leaves oblong to narrowly lanceolate, 2 – 12′ long, attenuate to a long petiole, acuminate or acute, sometimes spatulate, irregularly sinuate-toothed or pinnatifid- or repand-denticulate; calyx-tube 2 – 7′ long, thick, 3 – 6″ wide at the throat, the tips of the segments not free in the bud; petals broadly obcordate, ¾ – 1¾′ long; capsules oblong, 1 – 2½′ long, 3 – 6″ thick, subattenuate at each end, sessile or short-pedicelled, strongly ribbed on the sides and often with a double crest along the sutures; seeds 1½″ long, in two rows in each cell, oval-oblong, not angled, very minutely and densely tubercled

upon the back with thin, flattened processes, and with a narrow, longitudinal furrow on the ventral side. — From the Upper Missouri to Nebraska, Nevada, New Mexico, and Sonora. The typical, wholly glabrous form appears to be found only on the Upper Missouri in Dakotah and Nebraska.

20. Œ. PRIMIVERIS, Gray. Annual or biennial, acaulescent or nearly so, often very small, more or less villous with spreading, substrigose hairs; leaves 1 – 4′ long, lyrate-pinnatifid or the lower oblanceolate and entire, narrowed into a petiole; calyx-tube 1 – 2′ long, slender, slightly dilated at the throat; petals obcordate, 4 – 9′ long; capsule ovoid-conical, not crested nor angled, ribbed and reticulately veined; seeds as in the last, but irregularly pitted, or rugose and very minutely tuberculate. — Western Texas and New Mexico.

21. Œ. TRILOBA, Nutt. Biennial or perennial, very rarely with a stem 1 – 2′ long, nearly glabrous; leaves 2 – 10′ long, somewhat ciliate, long-petioled, runcinate-pinnatifid or oblanceolate and only sinuately toothed, the segments usually repandly denticulate; calyx-tube slender, 2 – 4′ long, slightly dilated at the throat, the tips of the segments free; petals broadly obovate, ½ – 1′ long, subentire, 3-nerved; capsules persistent, oval or obovate, ¾ – 1¾′ long, acutely 4-toothed at the apex, strongly winged at the angles, the sides ribbed and reticulately veined; seeds 1″ long, angled, minutely and densely tuberculate. — From the Saskatchewan to Nevada and California, and southward to Texas, New Mexico, and Sonora.

22. Œ. BRACHYCARPA, Gray. Perennial, acaulescent or nearly so; pubescence canescent, short, usually dense, subtomentose; leaves rather thick, ovate to linear-lanceolate, 3 – 8′ long, long-petioled, usually lyrately pinnatifid, the lower, or sometimes all, entire or more or less deeply sinuate-toothed; calyx-tube 2 – 4′ long, thick, somewhat dilated upward; petals 1½′ long, broadly obcordate or entire, more or less purplish from the first; capsule ovate, 8 – 12″ long, ½′ broad, subattenuate upwards and subcompressed, rigid and coriaceous or corky, the angles winged, the sides smooth; seeds in two rows (or sometimes but one) in each cell, 1½″ long, with a thickened corky testa, strongly angled, crested at the summit, minutely tuberculate, somewhat rugose transversely at the base. — New Mexico. Flowering specimens, belonging either to this species or the next, have been collected in Western Texas and through Nevada to Montana.

23. Œ. WRIGHTII, Gray. Distinguishable from the last only by the

characters of the capsule, which is 1 – 1½′ long, more attenuated upwards, membranous-coriaceous and not corky. The seeds as known are imperfectly developed, but show little difference except in the want of the corky testa. As the fruit of *Œ. brachycarpa* is variable in these respects, it is probable that this may be only a form of that species. There may prove to be a distinguishing character, however, in the calyx, — the bud close and obtuse in *Œ. Wrightii*, acuminate and with free, slender tips in *Œ. brachycarpa.* — New Mexico.

* * * * * Caulescent perennials; flowers axillary, yellow, except in *Œ. canescens;* calyx-tube slightly dilated upwards; capsule short-pedicelled or sessile, ovate to orbicular, strongly angled or very broadly winged; seeds in one row in the cells. — *Megapterium*, Spach.

24. Œ. CANESCENS, Torr. Low, diffuse, ½° high; stems ascending or subdecumbent, leafy to the summit; pubescence canescent, minute, substrigose, appressed; leaves numerous, linear to narrowly lanceolate, 3 – 6″ long, entire or sparingly toothed; flowers near the ends of the branches; calyx-tube rather stout, 6 – 8″ long, the tips of the segments not free in the bud; petals broadly obovate, entire, ½′ long, white, spotted and tinged with rose-color; capsule ovate, 3 – 4″ long, sessile, acute, prominently angled, not strongly ribbed; seeds oblong, acute, angled, very nearly smooth. — From the upper waters of the Platte to New Mexico. The section *Gauropsis* was proposed by Dr. Torrey for this species, but the color of the flowers is the only prominent distinction.

25. Œ. FREMONTII. Stems low and tufted, 2 – 6′ high, simple, ascending; pubescence canescent, short and silky, dense and appressed; leaves narrowly lanceolate, 2′ long, acuminate, attenuate to a slender petiole, entire or obscurely denticulate; flowers below the ends of the branches; calyx-tube slender, 1 – 2′ long, the segment-tips free in the bud; petals emarginate, ½ – 1′ long; capsules 8″ long by ½′ wide, very broadly winged, rounded and not emarginate at the apex, on pedicels 1″ long or less, densely canescently silky; seeds 4 – 5 in each cell, oblong-ovate, not crested nor tuberculate. — Collected by Fremont on his second expedition (locality not given), by Dr. Bigelow (363) on the Mexican Boundary Survey at Santa Barbara in the Rio Grande Valley, and by Dr. Parry on dry, chalky hillsides near Smoky Hill, Kansas.

26. Œ. MISSOURIENSIS, Sims. Stems decumbent or ascending, simple or somewhat branched, very short or 1° or more long and sub-

woody at base; pubescence canescent, short and silky, closely appressed, sometimes dense or wholly wanting; leaves thick, oval to linear, mostly narrowly lanceolate, 2 – 5′ long, acuminate, attenuate to a usually slender petiole, entire or repand-denticulate; calyx-tube rather thick, 2 – 5′ long, the segments often spotted with purple, the tips free in the bud and slender; petals 1 – 2½′ long, broad, with usually a short abrupt acumination; capsules very broadly winged, 1 – 3′ long, nearly as wide, emarginate at the summit, shortly pedicelled, subcompressed, coriaceous-membranous, mostly glabrous; seeds 2″ long, strongly tuberculate, with a conspicuous crested border surrounding the upper end and extending partially down the ventral side in a double line. — From Missouri to Texas.

27. Œ. MACROSCELES, Gray. Perennial (or biennial?), glabrous; stems elongated; radical leaves spatulate to lanceolate, 7 – 12′ long, long-attenuate at base, acute, the cauline subsessile, oblong to lanceolate, all strigosely ciliate, entire; calyx-tube slender, 4 – 5′ long, the stout tips of the segments free in the bud; petals broadly obcordate, 1 – 1½′ long; fruit unknown; ovary 1′ long, linear, smooth, apparently with rudimentary wings. — This species from Northern Mexico, of Gregg's collection, was referred by Dr. Gray to the subsection *Onagra;* more perfect material is needed before its position can be determined.

§ 2. TARAXIA, Nutt. (Including § *Primulopsis,* Torr. & Gray.) Stigma capitate; calyx-tube filiform, funnelform at the summit, marcescent; anthers oval or oblong, attached near the middle, the petaline filaments shorter (nearly equal in *Œ. ovata*); capsule sessile, ovate or narrowly conical to linear, membranous, tetragonal (winged above in *Œ. graciliflora*); seeds ascending, in two rows in each cell, oblong, terete. Acaulescent or nearly so, the yellow flowers erect in the bud, tips of the calyx not free.

28. Œ. BREVIFLORA, Torr. & Gray. Perennial (or biennial), acaulescent, subpubescent or nearly glabrous; leaves lanceolate, 2 – 6′ long, petioled, acuminate, deeply sinuate-pinnatifid, the numerous very unequal segments acute or acutish, toothed or entire; calyx-tube 3 – 6″ long; petals becoming rose-color, 3″ long; capsule 6 – 10″ long, 1½ – 2″ broad below and attenuate above into the persistent calyx-tube, subtetragonal, subsulcate, and somewhat curved; seeds numerous, nearly 1½″ long, very minutely longitudinally striate.— Southern Wyoming, Colorado, and Eastern Utah.

29. Œ. NUTTALLII, Torr. & Gray. (*Œ. tanacetifolia*, Torr. & Gray.) Resembling the last. Rarely shortly caulescent, more densely and canescently pubescent; segments of the leaves frequently rounded or obtuse; calyx-tube $1-2\frac{1}{2}'$ long; petals $5-7''$ long; capsules similar but rarely developed. — From Washington Territory to Northern California and Nevada.

30. Œ. HETERANTHA, Nutt. Perennial, acaulescent, glabrous; leaves lanceolate to oblong-lanceolate, $3-6'$ long, acute or acutish, attenuate at base into a petiole, rarely slightly repand-denticulate; calyx-tube $1-3'$ long; petals $3-6''$ long, not becoming reddish; capsule $9''$ long, ovoid-oblong, tetragonal, attenuate above into the persistent calyx-tube, the sides nearly flat, ribbed, subreticulated; seeds numerous, $\frac{2}{3}''$ long, minutely pitted. — From Idaho to Northern Nevada and Northern Utah.

Var. TARAXACIFOLIA. Leaves 1° long, lyrately pinnatifid; the capsules decidedly pedicillate. — A single immature specimen has been collected near Austin, Nevada; probably distinct.

31. Œ. OVATA, Nutt. Resembling the last. Root very thick; subpubescent; leaves ovate to oblong-lanceolate, shortly ciliate, $2-8'$ long, acute, erosely or repandly denticulate or serrulate; calyx-tube $1-4'$ long; petals $3-10''$ long; filaments nearly equal; capsule $\frac{1}{2}'$ long, strongly torulose; seeds few, in one or two rows, erect, oval, $1''$ long. — From San Francisco, California, to Monterey.

32. Œ. GRACILIFLORA, Hook. & Arn. Annual, acaulescent, small, villous; leaves linear, $1\frac{1}{2}-2\frac{1}{2}'$ long, acuminate or obtuse, attenuate or more frequently broad at the base, entire or obscurely repand-denticulate, ciliate; calyx-tube $\frac{1}{2}-1\frac{1}{2}'$ long; petals $3-5''$ long, turning greenish; capsule compressed-ovate, $5''$ long, coriaceous, tetragonal below and 4-winged above the middle, the wings obliquely truncate and hairy; seeds horizontal, smooth. — California, from the Sacramento River to Monterey.

§ 3. MERIOLIX, Raf. (*Calylophis*, Spach, and *Salpingia*, Nutt.) Stigma dilated, disciform; calyx-tube linear to funnelform, more or less broadly dilated at the mouth; petals yellow; anthers oblong-linear, attached at the middle, the filaments slightly unequal; capsule linear-cylindric, sessile or nearly so; seeds in two rows in each cell, ovoid or ovoid-oblong, strongly angled, very nearly smooth. Mostly perennial, caulescent, somewhat woody at base; flowers axillary, erect in the bud.

33. Œ. Hartwegi, Benth. Suffruticose, usually low, 3 – 15′ high, decumbent or ascending, branched, more or less canescent or glabrous; leaves numerous, often crowded, linear to lanceolate, ½ – 2′ long, obtuse or acutish, entire or sometimes sparingly repand-denticulate; flowers mostly near the ends of the branches; calyx-tube often slender, 1 – 2′ long, 2 – 6″ broad at the throat, much exceeding the ovary, pubescent or glabrous, the segments with free linear tips; petals rhombic-ovate, acute or acutish, 4 – 12″ long; capsule 8 – 10″ long, 1 – 1½″ thick, sessile, erect, attenuate at base; seeds oval, very obscurely tuberculate. — From the Indian Territory to Western Texas and Northern Mexico.

Var. LAVANDULÆFOLIA. (*Œ. lavandulæfolia*, Torr. & Gray.) Low, 3 - 6′ higher, pubescent throughout, the leaves mostly linear, ¼ – 1′ long, the calyx-segments less attenuated above. — From Kansas and Colorado to Mexico.

Var. Fendleri. (*Œ. Fendleri*, Gray.) Stouter, mostly glabrous, with oblong-lanceolate leaves and large flowers with a broad throat.

34. Œ. Greggii, Gray. Scarcely more than a variety of the last. More shrubby and diffuse, low, viscidly pubescent or more or less hirsute; leaves ovate to oblong, 1 – 3″ long, acute, mostly sessile; flowers mostly terminal, the calyx-tube slender, 8 – 15″ long; petals acutish, 3 – 6″ long; capsule ½′ long. — New Mexico and Northern Mexico; on the Canadian River (Gordon).

35. Œ. TUBICULA, Gray. Biennial or perennial, usually subwoody, diffusely branched, 4 – 12′ high, minutely glandular-puberulent; leaves linear to oblong-lanceolate, ½ – 1′ long, acute, entire, the lower petioled; calyx-tube 4 – 7″ long, 2″ broad in the throat, the segments short and ovate, with short, free tips; petals rounded-obovate, obtuse or acute, 4 – 5″ long; capsule 4 – 7″ long, 1″ broad, nearly terete, shortly pedicelled, dehiscing the whole length; seeds ovoid-oblong, ½″ long. — New Mexico and Northwestern Texas.

36. Œ. SERRULATA, Nutt. Slender, 3 – 15′ high, simple or branched, canescent with short, appressed hairs or nearly glabrous; leaves linear to lanceolate, 1 – 3′ long, mostly acute or acutish, attenuate to the base, irregularly and sharply denticulate; calyx-tube broadly funnelform, 2 – 4″ long, strongly nerved, the short ovate segments with short, free tips; petals broadly obovate, 3 – 4″ long, crenulate; capsules 9 – 15″ long, 1″ wide, subsulcate over the sutures, sessile, often narrowed to a slender base; seeds very small, ¼″ long. — From the Saskatche-

wan to Wisconsin, and westward of the Mississippi to Texas and New Mexico.

Var. SPINULOSA, Torr. & Gray. Usually nearly glabrous, the stems rather stout, subdecumbent, sometimes 2 – 3° long; flowers larger, the tube 6 – 10″ long, with a slender base and equalling the petals; the stigma and throat of the calyx occasionally very dark-purple or orange. — From the Indian Territory to Texas.

Var. PINIFOLIA, Engelm. Leaves very narrowly linear and subrevolute; flowers as in var. *spinulosa.* — Texas.

§ 4. SPHÆROSTIGMA, Spach. Stigma capitate; calyx-tube obconic or shortly funnelform; petals entire or emarginate; stamens somewhat unequal, the oblong anthers attached near the middle; capsules linear, sessile, terete or tetragonal, attenuated at the apex and more or less contorted; seeds ascending in a single row in each cell, ovate to linear-oblong, smooth or nearly so. Caulescent annuals or biennials, the spikes usually crowded, bracteate or leafy.

* Flowers white or rose-colored, in a nodding spike; calyx-tube funnelform; capsule narrowly linear, terete, much contorted; seeds linear, acute at each end.

37. Œ. ALYSSOIDES, Hook. & Arn. Canescently puberulent, usually branching from the base, 3′– 1° high; leaves oblanceolate or oblong-lanceolate, 1 – 2½′ long, attenuate into a slender petiole, entire or repand-denticulate, the bracts much smaller but similar; spike many-flowered, becoming elongated; calyx-tube 2 – 3″ long, equalling the orbicular entire petals; capsules puberulent, 8 – 12″ long, very slender and scarcely thicker at base; seeds nearly white, very minutely pitted. — From Southern Idaho through Nevada and Utah.

Var. VILLOSA. More or less villous throughout. — Nevada.

Var. MINUTIFLORA, Watson. Flowers much reduced, scarcely more than 1″ long. — Northern Nevada and about Salt Lake, Utah.

38. Œ. BOOTHII, Dougl. With the habit of the last, but viscidly pubescent; leaves ovate, ½ – 1′ long, acuminate or acute, denticulate, shortly petioled; calyx-tube 1 – 3″ long; petals 2 – 3″ long; capsules linear-fusiform, 6 – 9″ long, 1″ broad at base and attenuate upward, much contorted; seeds brownish, angled, very minutely tuberculate, over ½″ long. — Eastern Oregon to Northern Nevada.

39. Œ. GAURÆFLORA, Torr. & Gray. Erect, often stout, ½ – 2° high, simple or branched, glabrous, or the calyx, ovary, and younger

leaves sparingly puberulent, the bark becoming white, shining and loose; leaves lanceolate or narrowly oblanceolate, acute or acuminate, narrowed to a petiole, usually denticulate; spike erect or somewhat nodding, elongated, few-many-flowered; calyx-tube and the obovate petals 1½ – 3″ long; capsule linear-fusiform, 8 – 15″ long, subtetragonal, 1″ wide at base, and attenuate upward to a narrow beak; seeds 1″ long or more, linear, angled, densely cellular-pubescent under the microscope. — Southern California and Arizona.

* * Flowers yellow, turning green; calyx-tube obconic; capsules linear, tetragonal, more or less contorted; stems leafy throughout. Annual or biennial.

40. Œ. CHEIRANTHIFOLIA, Hornem. Spreading with decumbent or ascending stems, often 2° long or more, canescently pubescent; leaves thick, ½ – 2½′ (often less than 1′) long, broadly ovate to oblong or lanceolate, the radical and lower cauline leaves spatulate or oblanceolate with a slender petiole, the upper very shortly petioled, sessile or clasping, acute or obtuse, mostly entire, sometimes obscurely denticulate; calyx-tube 1 – 1½″ long; petals 3 – 4″ long; capsule 4 – 8″ long, attenuate upward, curved, subhairy; seeds ovate-oblong, ½″ long, acute at base, smooth. — On the sea-coast, near San Francisco and southward. Like many other species, beginning to flower when very small. It is said to have come originally from Chili, and Gay mentions it as occurring in several provinces of that republic. There are no Chilian specimens in our herbariums, but the California plant accords essentially with the early figures and descriptions.

Var. SUFFRUTICOSA. (*Œ. viridescens*, Hook.) Woody at base and perhaps perennial, densely hoary-tomentose or rarely glabrous; leaves mostly small, ¼ – 1′ long, crowded; flowers usually larger, the petals 4 – 9″ long. — Sea-coast of Southern California, from Monterey to Santa Barbara.

41. Œ. BISTORTA, Nutt. Rather stout, subdecumbent or ascending, 1 – 2° high, branched from the base, simple above, somewhat hirsute, the leaves sometimes appressed-pubescent; radical leaves spatulate to lanceolate, petioled, the cauline mostly sessile, ovate to narrowly lanceolate, about 1′ long, acute or acutish, often obtuse and clasping at base, all denticulate or dentate; calyx-tube 1 – 3″ long; petals 4 – 7″ long; usually with a brownish spot at base; capsules 4 – 9″ long, acutely tetragonal, 1″ or more wide, subattenuate at base and narrowed

above to a short beak, much contorted; seed dark, ovate-oblong, ½″ long, smooth. — San Diego.

Var. (?) VEITCHIANA, Hook. A more slender, often very reduced form; radical leaves narrowly oblanceolate and long petioled, 2 – 4′ long, the cauline often attenuate to the base; capsule more elongated and narrower, less than 1″ broad and 1 – 1½′ long, attenuate into a narrow beak at the apex, less contorted. — Southern California; Los Angeles, San Gabriel, San Diego, etc.

42. Œ. MICRANTHA, Hornem. Rather stout, erect or ascending from a decumbent base, simple or branched, becoming 1½° high, more or less hirsute; leaves narrowly lanceolate to ovate, ½ – 2′ long, the radical petioled, the cauline narrowed at base or cordate and clasping; flowers small, the calyx-tube 1″ long or less, the petals 1 – 2″ long, obovate, entire or emarginate, or sometimes 3-toothed; capsules 8 – 15″ long, acutely tetragonal, about 1″ wide at base, attenuate upward to the shortly beaked apex, usually much contorted; seeds as in the last. — Middle California, from the Sacramento to Fort Tejon.

* * * Flowers small, yellow, usually turning red; calyx-tube very short; capsule elongated, very narrowly linear, slightly curved.

43. Œ. CHAMENERIOIDES, Gray. Slender, erect, branching, 4 – 12′ high, somewhat viscidly puberulent; leaves distant, lanceolate, 1 – 2′ long, the uppermost sessile, the lower petioled, obscurely repand-denticulate; spike loose, the bracts small; calyx-tube 1″ long or less, the petals scarcely as long; capsules 1¼ – 2′ long, ½″ thick; seeds linear, ⅓″ long, white and shining. — New Mexico and Arizona.

44. Œ. DENTATA, Torr. & Gray. (Cav.?) Slender, usually diffusely branched, 1° high or less, more or less hirsute with short spreading hairs, especially towards the base, the pubescence above often shorter and somewhat glandular, or wanting; leaves linear, ½ – 1½′ long, usually narrowed at base, denticulate; petals 2 – 4″ long, rounded, entire, rarely reddening; calyx-tube broadly obconic, ½ – 1½″ long; capsule 1 – 1½′ long, sessile, attenuate above into a slender beak; seeds ⅓″ long, smooth. — From Sacramento Valley to Southern California.

This is perhaps the *Œ. dentata* of Cavanilles, though no similar Chilian specimens are in our herbariums. Plants so named, collected in Chili by Gay and Harvey, seem to be identical with the next species. Cavanilles's figure represents a simple-stemmed form with flowers and foliage nearly as in the Californian plant. The figure of Ruiz and

Pavon is yet more similar, but in both cases the stigma is figured and described as short-lobed.

Var. CRUCIATA. Petals narrowly obovate to oblong, 2″ long, often emarginate.

45. Œ. STRIGULOSA, Torr. & Gray. Nearly glabrous, the ovary and calyx usually somewhat appressed-puberulent; stems slender, ascending or erect, simple or branched, 2′ – 1° high; leaves linear or lanceolate, 3 – 9″ long, attenuate to the base, entire or sparingly denticulate; flowers very small, the petals 1 – 2″ long, usually reddening; capsule 8 – 13″ long, sessile or attenuate into a very short pedicel adnate to the petiole, scarcely attenuate above, more or less curved; seeds $\frac{1}{3}$″ long, smooth. — From the Columbia River to San Diego, California. This includes the *Œ. parvula* and *siliquosa* of Nuttall, and probably also the *Œ. contorta* of Hooker, which is the older name, but less appropriate.

Var. PUBENS. Pubescence hirsute and spreading, as in *Œ. dentata*, especially below, often subglandular above and shorter; sometimes nearly smooth. — From Washington Territory to Southern California, and through Northern Nevada to the Wahsatch.

* * * * Low; flowers minute; capsule fusiform, short.

46. Œ. ANDINA, Nutt. But 1 – 3′ high, becoming diffusely branched, canescently puberulent throughout; leaves linear-spatulate, $\frac{1}{2}$ – 1′ long, attenuate into slender petioles; spikes mostly dense, many-flowered, erect; flowers 1″ long, yellow; capsules 3 – 6″ long, attenuate upward from near the base; seeds linear-oblong, $\frac{1}{2}$″ long, nearly smooth. — From Eastern Oregon to Montana, Northern Nevada, and Utah.

§ 5. CHYLISMIA, Nutt. Stigma capitate; calyx-tube funnelform or obconic; petals entire; stamens unequal, with the oblong anthers attached near the middle; capsules linear, subcylindrical or subclavate, obtuse, membranous, not sessile and usually long-pedicelled; seeds ascending in a single row in each cell. Caulescent annuals.

* Racemes loose, naked, usually few-flowered; seeds oblong-lanceolate, smooth.

47. Œ. SCAPOIDEA, Nutt. Erect, 4 – 18′ high, usually branching from near the base, puberulent or subglabrous; leaves mostly subradical, long-petioled, lyrately pinnate or sometimes undivided, the terminal leaflet much the largest, ovate to oblong-lanceolate, cuneate or cordate at base, irregularly sinuate-toothed, the prominent veins often dark-colored,

the lateral leaflets few to many or none, very irregular in shape and size; raceme at first nodding, the bracts very small or wanting; calyx-tube funnelform with a narrow base, 1 – 2″ long, the bud close and abruptly acute; petals yellow, 1 – 2″ long; capsule glabrous, 4 – 12″ long, about 1″ broad, attenuate into a pedicel which is 2 – 8″ long and ascending or divaricate; seed ½″ long. — From Western Wyoming and Southern Idaho to Southern Utah.

Var. PURPURASCENS. Usually stouter, the flowers larger and pinkish-white or purplish, rarely yellow, the tube 2 – 3″ long, the petals 3 – 4″ long. — On the eastern side of the Sierra from Oregon to Mono Lake.

Var. AURANTIACA. (*Œ. clavæformis*, Torrey.) Low, 3 – 10′ high; inflorescence puberulent; calyx-tube more or less orange; petals light rose-color or orange; capsule usually puberulent. — Southern California and Arizona.

48. Œ. BREVIPES, Gray. Like the last but usually stouter, ½ – 2° high, more or less villous with stiff hairs, not puberulent; calyx-tube obconic to funnelform, 1 – 3″ long, the segments strongly nerved and the stout tips free; petals 3 – 6″ long, apparently pale yellow or whitish; capsule 1 – 3′ long, 1¼″ broad, the pedicel 2 – 12″ long. — Southern California and Arizona.

49. Œ. CARDIOPHYLLA, Torr. Often rather slender, 3 – 10′ high, simple, erect or ascending, canescently hirsute with short spreading hairs; leaves scattered, simple, cordate or ovate, ¼ – 1¼′ long, repandly serrate, long-petioled; calyx-tube rather narrowly funnelform, 3 – 4″ long, the bud close, usually tinged with red; petals 3 – 4″ long, yellow turning to rose-color; capsule ¾ – 1½′ long, attenuate to a pedicel which is but 1 – 3″ long. — Southern California and Arizona.

50. Œ. MULTIJUGA, Watson. Glabrous or very sparingly villous, much branched above; leaves 6′ long, pinnate with many subequal leaflets 1′ long, the terminal one not larger, and with smaller ones interposed between the others, all oblong-lanceolate, acute, very irregularly and somewhat doubly sinuate-serrate, strongly veined; calyx-tube obconic, 1″ long, the bud close and obtuse; petals 4″ long, light yellow; immature capsule 9″ long, equalling the pedicel. — Southern Utah; described from a single fragmentary specimen.

* * Flowers leafy-bracted, very small; seeds oblong, deeply concave on the inner side and somewhat wing-margined, cellularly papillose.

51. Œ. PTEROSPERMA, Watson. Erect, 2 – 3′ high, simple or

branched, more or less hispid-pubescent; leaves oblong-lanceolate, 6 – 9″ long, obtuse, entire; calyx-tube very short, obconic; petals obcordate, rose-color, 1″ long; capsule cylindrical-clavate, 6 – 9″ long, attenuate at base into a spreading pedicel half as long; seeds 1″ long, the margins thin and incurved, minutely cellularly tuberculate. — Foot-hills of the Trinity Mts., Northwestern Nevada.*

§ 6. GODETIA, Spach. Stigma-lobes short, linear or roundish; calyx-tube obconic or short-funnelform; petals flabelliform, lilac-purple or rose-color; stamens unequal, the petaline filaments the shortest; anthers oblong, fixed near the base, erect or becoming arcuate; capsules ovate to linear, subcoriaceous, 4-sided; seeds horizontal, in one row, angled, vertically compressed, partially imbricated, and so the upper surface margined by a thin tuberculate crest. Annuals, simple or branching.

* Capsule ovate to oblong, sessile; stems erect, leafy, usually stout and strict, the flowers in a strict compacted spike, erect in the bud.

52. Œ. GRANDIFLORA. (*Godetia*, Lindl. *Œ. Whitneyi*, Gray.) Stem 1 – 2° high, simple or with a few short branches near the top; puberulent; leaves lanceolate, 1 – 3′ long, acute at each end or attenuate into a short petiole, obscurely repand-denticulate or entire; spike crowded; calyx-tube broadly obconical, 4 – 6″ long, the tips not free; petals 1 – 2′ long, broad, emarginate, rose-color or light purple with often a large crimson spot in the centre; stigma-lobes linear, 3″ long; capsule fusiform-oblong, 8 – 15″ long, 3 – 4″ broad, sessile or nearly so, shortly pubescent, the sides not costate; seeds ½″ long, very minutely pitted. — Humboldt and Mendocino Counties, California, on hillsides and benches.

53. Œ. PURPUREA, Curtis. Mostly very leafy, 1 – 2° high, canescently puberulent, the ovary hirsutely villous; leaves oblong to oblong-lanceolate, 1 – 3′ long, obtuse or acute, entire, sessile with an obtuse or attenuate base; flowers mostly in a leafy terminal cluster; calyx-tube

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* Œ. ARBOREA, Kellogg, from the Cerros Islands, off the coast of Lower California, is a well-marked species allied to those of this section. It is described as suffrutescent, erect and branched, 6 – 8° high, with small linear-lanceolate sessile entire villous leaves, flowers in dense erect spikes, the slender funnelform calyx-tube 1′ long (including the ovary?), the purplish petals 3″ long, capsules 3 – 12″ long, 1½″ broad, erect upon stout divaricate pedicels which are 3 – 6″ long; the seeds are linear-oblong, 1½″ long.

2 – 3″ long, the tips not free; petals 4 – 6″ long, deep purple; style shorter than the stamens, the stigma-lobes very short, purple; capsules ovate to linear-oblong, 6 – 9″ long, 2 – 2½″ broad, acute, not attenuate at base, hairy, the sides nearly flat, ribbed. — From the valley of the Columbia to Monterey, California.

54. Œ. LEPIDA, Hook. & Arn. Erect, ½ – 2° high, canescently puberulent, the stem usually white and shining; leaves oblong to oblong-lanceolate, 1 – 2′ long, usually obtuse, sessile and scarcely attenuate at base, sparingly denticulate; flowers in a short simple spike; calyx-tube 2 – 3″ long, the tips very slightly free; petals 9 – 12″ long, rose-color with a darker spot near the apex; stigmas very short, purple; capsule 5 – 8″ long, 2″ broad near the base and attenuate to the apex, hairy, the sides bicostate, at least alternately. — From the Upper Sacramento to St. Simeon (Nuttall).

Var. PARVIFLORA. (*Œ. decumbens*, Dougl.) Slender, erect or ascending, 3′ – 3° high; leaves linear to oblong, ½ – 1′ long; calyx-tube 2″ long; petals 3 – 8″ long, purple to rose-color; capsule shortly pubescent, 4 – 6″ long. — From the Columbia River to Monterey.

Var. ARNOTTII. (*Œ. Arnottii*, Torr. & Gray.) Nearly glabrous or subcanescently puberulent; leaves linear to lanceolate, 1 – 1½′ long, acute, entire or sparingly denticulate; petals 4 – 8″ long; capsules glabrous or nearly so. — California.

55. Œ. ALBESCENS. (*Godetia*, Lindl.) Simple or branching from the base, erect, 1 – 2° high, canescently puberulent; leaves linear to oblong-lanceolate, 1′ long, acutish, sparingly denticulate; flowers small, in numerous short lateral spikelets, mostly crowded into a compact spike; calyx-tube 2″ long; petals 3 – 5″ long, purplish-blue; stigmas greenish to purple; capsules oblong, 3 – 6″ long, 1½″ broad, shortly hirsute or pubescent, at least the alternate sides bicostate. — Central California.

* * Capsule linear; flowers loosely scattered in a slender spike or raceme, nodding in the bud; stems slender, less leafy.

† Capsules sessile.

56. Œ. WILLIAMSONI, Durand & Hilgard. Erect, 1° high, canescently puberulent, the calyx villous; leaves linear, 1 – 1½′ long, entire; flowers subapproximate; calyx-tube funnelform, 3 – 5″ long, the tips free; petals 6 – 12″ long, yellow at base, and with a deep purple spot

in the centre; stigma-lobes short, oblong, yellow; capsules linear-fusiform, ½′ long, tapering from above the base to the apex, furrowed over the sutures, and therefore 8-costate, puberulent. — Collected by Bridges, Heermann, and Rattan, probably on the western flank of the Sierra, from Fort Miller northward.

57. Œ. QUADRIVULNERA, Dougl. Usually very slender, erect or ascending, 1 – 2° high, puberulent; leaves linear to linear-lanceolate, 1 – 2′ long, sessile or attenuate to a short petiole, entire or slightly repand-denticulate; calyx-tube obconic, 2″ (rarely 3″) long, the tips slightly free; petals 3 – 6″ long, deep purple or purplish; stigma-lobes very short, yellow; ovary and capsule hairy, the capsule linear, 5 – 10″ long, mostly short, attenuate at the apex, scarcely so at base, the sides nearly flat, or channelled by the prominence of the sutures. — From Puget Sound to San Luis Obispo.

58. Œ. TENELLA, Cav. Erect, 6 – 18′ high, puberulent; leaves linear, ½ – 2′ long, acute or obtuse, more or less attenuate at base, mostly entire; calyx-tube shortly obconic, 1 – 3″ long, the tips close or slightly free; petals 3 – 5″ long, deep purple; stigma-lobes purple or purplish, the style shorter than the stamens; capsules puberulent, 8 – 12″ long, attenuate above but not at base, the sides nearly flat. — From Oregon to San Diego. No. 638 Brewer, from Monterey, seems to be a reduced decumbent form. The Californian plant is apparently identical with Chilian specimens collected by Gay, Bertero (469), Harvey, and Gillies.

59. Œ. VIMINEA, Dougl. Near the last. Usually stout, 1 – 3° high, branched, spreading-puberulent; leaves linear to linear-lanceolate, 1 – 2′ long, narrowed at the base, entire; calyx-tube 2 – 4″ long, the tips slightly free; petals 9 – 12″ long, deep purple or purplish; capsule 9″ long, 8-costate, smoothish. — From the Columbia River to the Sacramento, and in the mountains to the Yosemite Valley.

60. Œ. ROMANZOVII, Ledeb. Rather stout, ascending or subdecumbent, 1½° high, leafy to the top, canescently puberulent, the ovary very silky; leaves oblanceolate, 1 – 2′ long, petioled, entire or very obscurely repand-denticulate; calyx-tube very short, segments short, the tips not free in the bud; petals 6″ long, purple; filaments stout, the shorter stamens with nearly sessile anthers; stigmas not exserted beyond the calyx-tube; capsule 8 – 9″ long, attenuate at each end, sessile or slightly pedicelled, the sides channelled between the prominent sutures. — Only known from cultivated specimens, originally from seeds collected by Chamisso on the "Northwest Coast."

† † Capsules pedicelled, not costate; stigmas mostly yellow; calyx-tips not free in the bud (or very rarely in *Œ. amœna*).

61. Œ. AMŒNA, Lehm. Usually slender, erect, 1 – 2° high, minutely puberulent; leaves linear to narrowly oblanceolate, or sometimes lanceolate, 1 – 3′ long, petioled, entire or nearly so; calyx-tube obconic, 2 – 4″ long; petals 8 – 15″ long, frequently rather villous, as also the purple anthers, varying from nearly white to rose-color, with more or less of purple; filaments rather stout; stigma-lobes linear, 1½″ long, yellow; capsules 1 – 1½′ long, attenuate to a slender beak above and into the pedicel below, which is 2 – 6″ long. — From Vancouver's Island and Fraser's River to San Francisco and southward.

62. Œ. BOTTÆ, Torr. & Gray. Erect or subdecumbent at base, 1 – 1½° high, usually branched, canescently puberulent or more or less glabrous; leaves narrowly linear to lanceolate, 1 – 2′ long, on slender petioles, sparingly repand-dentate or entire; calyx-tube short; petals 6 – 12″ long, light purple; filaments usually slender, and style elongated; stigma-lobes short, yellow or purple; capsule 10 – 15″ long, attenuate at each end, the pedicel 3 – 9″ long. — Southern California, from Monterey to San Diego and Santa Barbara.

63. Œ. EPILOBIOIDES, Nutt. Erect, 1 – 3° high, tomentosely puberulent; leaves linear to linear-lanceolate, 1 – 2′ long, petioled, entire or sparingly denticulate; calyx-tube 1 – 2″ long; petals 3 – 6″ long, light purple or rose-color; stigma-lobes short; capsule 6 – 41″ long, acuminate, attenuate to a short pedicel, or rarely nearly sessile. — Apparently common, especially on the flanks of the Sierra, from Oregon to the Stanislaus River, and San Diego (Nuttall; Thurber); also in Nevada near Carson City (Anderson; Stretch). Nuttall's original specimens are small and immature, but the stigma is plainly lobed, as also appears from the description, and there can be no doubt of the identity of the species.

64. Œ. HISPIDULA. Erect, ½ – 1° high, mostly simple and often but 1-flowered, hispidly puberulent, especially above; leaves very narrowly linear, 1 – 2′ long; calyx-tube 2 – 3″ long; petals 6 – 12″ long, purple; filaments rather slender; style elongated and stigma-lobes linear; capsule 4 – 9″ long, attenuate at the apex, abruptly contracted into a pedicel 2 – 4″ long. — Sacramento and Tulare Valleys, collected by Fremont, Pratten, and Rattan.

65. Œ. BILOBA, Durand. Erect, 1° high or more (procumbent in cultivation), subcanescently and minutely puberulent; leaves nearly

glabrous, linear or narrowly lanceolate, 1 – 2′ long, obscurely repand-denticulate, the lower on long, slender petioles ; calyx-tube 1 – 2″ long ; petals light purple, 4 – 9″ long, cuneate-obovate, more or less deeply 2-lobed ; stigmas ovate, united toward the base, apparently yellow ("purple," Durand) ; capsule 6 – 9″ long, puberulent, attenuate at the apex, abruptly contracted into a pedicel about 1″ long. — "Sacramento Mts." (Hartweg) ; Mount Bullion (Bolander) ; and other localities in Central California.

§ 7. BOISDUVALIA, Spach. Stigma-lobes very short, light-colored; calyx funnelform, the segments erect; petals obovate-cuneiform, 2-lobed, purple to white ; filaments slender, the petaline shorter ; anthers short, attached below the middle ; capsule membranous, ovate-oblong to linear-cylindric, nearly terete, acute, sessile, the sides ribbed, sutures thin, dehiscent to the base ; seeds ascending, few (3 – 8) in each cell, ovate-oblong, smooth ; flowers small, solitary in the axils of a leafy compound or simple spike, diurnal. Annuals, erect, simple or branched.

66. Œ. DENSIFLORA, Lindl. Strict, ½ – 1° high, canescently pubescent and more or less villous ; leaves lanceolate to linear-lanceolate, 1 –3′ long, acuminate, sessile, mostly denticulate, the floral usually much shorter and broader ; flowers usually in close terminal or numerous short lateral spikelets ; calyx 1½ – 3″ long, the petals about twice as long ; capsule ovate-oblong, 2 – 4″ long, 1½″ broad at base, attenuate upwards, smooth or slightly villous, the cells 3 – 6-seeded, the septa wholly adherent to the large placenta ; seeds nearly or quite 1″ long, subplano-convex. — From Washington Territory to Monterey, and on the eastern side of the Sierra at Carson City, Nevada (Anderson). Rather variable in the form of leaves and bracts, in the character and degree of pubescence, and somewhat so in the inflorescence.

67. Œ. TORREYI. Rather slender, branched, ½ – 1½° high, villous throughout with short, stiffish, spreading hairs ; leaves linear to lanceolate, 4 – 9″ long, entire or subdenticulate, usually attenuate to the base, the bracts similar and scarcely smaller ; spike simple, loose ; flowers very small, 1 – 2″ long, purplish ; capsules linear, 4 – 6″ long, 1″ wide, acuminate, the cells 6 – 8-seeded ; placenta narrow, the valves septiferous ; seeds more ovate and smaller, ½″ long or less. — From Oregon (190 Hall) and Central California (Bear Mt., Borax Lake, and New Almaden, Torrey).

68. Œ. GLABELLA, Nutt. Slender, erect, 1° high, glabrous or very slightly pubescent; leaves ovate to oblong-lanceolate, ½ – 1′ long, acute, sessile, serrate, the bracts but little smaller; spike simple; flowers shorter than the leaves, the petals less than 1″ long, deep purple; capsules 2 – 4″ long, ovate-oblong, the placenta narrow and valves septiferous; seeds 4 – 6 in each cell, linear-lanceolate, 1″ long. — From the Columbia Valley to Northern Nevada.

Doubtful Species.

Œ. PALUDOSA, Featherman, Bot. Rep. of Louisiana University, 1870, p. 74. This is probably some well-known plant; but if an *Œnothera*, the species is not recognizable from the description, which is much like Rafinesque's account of Œ. ALATA, Fl. Lud., p. 95, likewise reported from Louisiana, and not identified. The somewhat winged stems, globose stigma, habitat, etc., would indicate species of *Jussiæa.*

SYNONOMY.

55. ŒNOTHERA ALBESCENS. — No. 1730 Hartweg; 105, 107 Torrey; 273 Kellogg & Harford; Fremont.

Godetia albescens. Lindl., Bot. Reg., 27, Misc. 61; same, 28. **t. 9.**

Œ. purpurea. Bentham, Pl. Hartweg., 310.

10. ŒNOTHERA ALBICAULIS. Nuttall, "Fras. Cat."; Genera, 1. 245. James, Long's Exped., 2. 170. Torrey, Ann. N. Y. Lyc., 2. 201. Spreng., Syst., 2. 205. Hook., Fl. Bor. Am., 1. 210. Don's Mill., 2. 367. Torr. & Gray, Flora, 1. 495; Pac. R. R. Rep., 2. 164. Dietr., Syn., 2. 1287. Walpers, Repert., 2. 80; Annal., 4. 677. Torrey, Nicollet's Rep., 150; Fremont's Rep., 89 and 315; Emory's Rep., 140; Stansbury's Rep., 387; Pac. R. R. Rep., 4. 86; Bot. Mex. Bound., 65. Gray, Pl. Wright., 1. 69 and 2. 56; Pl. Thurb., 300; Pac. R. R. Rep., 12. 43; Amer. Jour. Sci., 2. 33. 405, in part, and 2. 34. 333; Proc. Amer. Acad., 8. 384. Hook., Pl. Geyer in Lond. Jour. Bot., 6. 223. Durand, Fl. Utah, 164. Cooper, Pac. R. R. Rep., 12. 52. Engelm., Pl. Upp. Miss., 191; Amer. Jour. Sci., 2. 34. 334. Bourgeau, Palliser's Rep., 256. Porter, Hayden's Rep., 1870, 476; 1871, 483. Watson, King's Rep., 5. 106.

Œ. Nuttallii. Sweet, "Hort. Brit., 2 ed., 199."

Baumannia Nuttalliana. Spach, "Suit. Buff., 4. 352."

Anogra Nuttalliana. Spach, Monog. Onag., 20.

Var. NUTTALLII. Engelm., Amer. Jour. Sci., 2. 34. 334. Watson, King's Rep., 5. 107. — Nos. 151, 198 Nicollet; 202, 234, 751, 753 Fremont; 223 in part, 224 Fendler; 117 Parry; 408 Watson; 136 Eaton; 178 Vasey; 184 Hall; 263 Kell. & Harf.; Nuttall; Tolmie; Stansbury; Newberry; Lyall; Bourgeau; Engelmann; Howard; Canby; Meehan.

Œ. pallida. Dougl.; Lindl., Bot. Reg., 14. **t. 1142**; Hook., Fl. Bor. Am., 1.

210. Don's Mill., 2. 687. Torr. & Gray, Flora, 1. 495. Dietr., Syn., 2. 1287. Walpers, Repert., 2. 80. Hook., Pl. Geyer in Lond. Journ. Bot., 6. 222.

Œ. leptophylla. Nutt. MS.

Baumannia Douglasiana. Spach, "Suit. Buff., 4. 352."

Anogra Douglasiana. Spach, Monog., 21.

Œ. pinnatifida, Var. *integrifolia.* Gray, Pl. Fendl., 44. Torrey, Pac. R. R. Rep., 7. 11.

Var. RUNCINATA. Engelm., l. c. — Nos. 178, 222 Fremont; 223 in part, 234 Fendler; 191, 1067 Wright; 296 Thurber; 360 Bigelow; Emory; Abert.

Œ. pinnatifida. Gray, Pl. Fendl., 43, in part; not Pursh. Torrey, Emory's Rep., 140.

Var. CALIFORNICA. — Wallace; Hutchings; Fitch; Shelton; Kell. & Harford.

Var. BREVIFOLIA. Engelm., l. c., 335. — "No. 99 Wislizenus."

Var. TRICHOCALYX. Engelm., l. c., 335. — "No. 473 Wislizenus."

37. ŒNOTHERA ALYSSOIDES. Hook. & Arn., Bot. Beech., 340. Torr. & Gray, Flora, 1. 511; Pac. R. R. Rep., 2. 121. Hook., Icones, t. **339**. Torrey, Fremont's Rep., 315, in part. Watson, King's Rep., 5. 111. — No. 337 Fremont, in part; 151 Stretch; 99 Torrey; 420 Watson, in part; Tolmie; Beckwith; Searles; Palmer.

Sphærostigma alyssoides. Walpers, Repert., 2. 78.

Var. VILLOSA. — Stansbury; Cooper; S. H. Wright; 420 Watson, in part.

Œ. scapoidea. Torrey, Stansbury's Rep., 387, in part.

Var. *minutiflora.* Watson, King's Rep., 5. 111. — No. 421 Watson.

61. ŒNOTHERA AMŒNA. Lehmann, Ind. Sem. h. Hamb., 1821, 8; (Litt. Ber. zu Linn., 1828, 8;) Nov. Stirp., pug. 1. 23; "Nov. Act. Acad. Leop., 1828, 811, t. **45**." Don's Mill., 2. 687. Torr. & Gray, Flora, 1. 503. Regel, Gartenflora, 13. t. **443**. — Nos. 408, 435 Fremont; 44, 109, 132 Wilkes; 103 Torrey; 65, 135, 407 Bolander; 754 Brewer; 98 Davis; 191 Hall; 264, 272 Kell. & Harf.; Nuttall; Tolmie; Lyall; Wallace; Fitch; Suckley; Hulse; Kellogg.

Œ. roseo-alba. Hornem., "Cat. Sem. h. Erf., 1824." "Reich., Icon. Exot., t. **47** and **150**." Sweet, Brit. Fl. Gard., t. **268**. Seringe, DC. Prodr., 3. 48. Dietrich, Syn., 2. 1289.

Œ. Lindleyi. Dougl.; Hook., Bot. Mag., t. **2832**. Don, Sweet's Brit. Fl. Gard., 2 ser., t. **19**; Mill., 2. 688. Lehm., Hook. Fl. Bor. Am., 1. 211. Lindl., Bot. Reg., t. **1405**. Hook. & Arn., Bot. Beech., 141 and 342. Torr. & Gray, Flora, 1. 502. Dietr., Syn., 2. 1287. Bentham, Bot. Sulphur, 14. C. A. Meyer, Ind. Sem. h. Petr., 11, Suppl. 58. Gray, Proc. Amer. Acad., 8. 384.

Godetia Lindleyana and *Lehmanniana.* Spach, Monog., 72.

Godetia vinosa. Lindl., Bot. Reg., 22. t. **1880**.

Godetia rubicunda. Lindl., Bot. Reg., 22. t. **1856**, and under t. 1880.

Œ. vinosa. Torr. & Gray, Flora, 1. 503. Dietr., Syn., 2. 1287. Torrey, Pac. R. R. Rep., 7. 11. Gray, Pac. R. R. Rep., 12. 61.

Œ. rubicunda. Hook. & Arn., Bot. Beechey, 342. Torr. & Gray, Flora, 1. 502. Dietr., Syn., 2. 1287.

Œ. macrantha. Nutt., MS.

Godetia macrantha and *amœna*. Lilja, Linnæa, 15. 265 and 17. 110.

? *Œ. arcuata*. Kellogg, Proc. Calif. Acad., 1. 58.

46. ŒNOTHERA ANDINA. Nutt.; Torr. & Gray, Flora, 1. 512. Watson, King's Rep., 5. 112. — No. 1058 Wilkes; 425 Watson; Nuttall; Burke.

Sphærostigma andina. Walpers, Repert., 2. 79.

ŒNOTHERA ARBOREA. Kellogg, Proc. Calif. Acad., 2. 32. Watson, above, p. 596. — Kellogg.

1. ŒNOTHERA BIENNIS. Linn., Spec., 346. Oeder, Fl. Dan., **t. 446**. Aiton, Hort. Kew., 2. 2. Michx., Flora, 1. 224. Pursh, Flora, 261. Nuttall, Genera, 1. 245. Elliott, Sketch, 1. 441. James, Long's Exped., 2. 343. Torrey, Ann. N. Y. Lyc., 2. 201. Hook., Fl. Bor. Am., 1. 209; Comp. Bot. Mag., 1. 25. Hook. & Arn., Bot. Beech., 141. Torr. & Gray, Flora, 1. 492. Torrey, Nicollet's Rep., 150; Fremont's Rep., 89; Sitgreave's Rep., 159; Pac. R. R. Rep., 12. 61. Gray, Pl. Fendl., 43; Pac. R. R. Rep., 12. 43; Ives's Rep., 11; Manual, 178. Parry, Bot. Minnesota, 612. Engelm., Pl. Upp. Miss., 192. Chapman, Flora, 138. Bourgeau, Palliser's Rep., 256. Porter, Hayden's Rep., 1870, 476; 1871, 483. Watson, King's Rep., 5. 106. — Douglas; Nuttall; Scouler; Spalding; Lyall; Fremont; Bourgeau; Engelmann; 405 Watson; 267 Kell. & Harford.

Onagra biennis. Mœnch., Methodus, 675.

Œ. gauroides. Hornem., "Hort. Hafn., 362." Don's Mill., 2. 686. Seringe, DC. Prodr., 3. 52. Dietr., Syn., 2. 1286.

Onagra vulgaris and *chrysantha*. Spach, Monog., 33 and 35.

Var. GRANDIFLORA. Lindl., Bot. Reg., 19. **t. 1604**. Torr. & Gray, Flora, 1. 492. Ruprecht, "Bull. Acad. St. Petr., 14. 237"; (Bull. Soc. Bot. France, 3. 437.) Gray, Manual, 178. Watson, King's Rep., 5. 106. — Nos. 190, 992 Wright; 91, 294 Anderson; 406 Watson; 134 Eaton; Torrey; Parry; Stretch.

Œ. grandiflora. Aiton, Hort. Kew., 2. 2. Bartram's Travels, 406. Pursh, Flora, 261. Hook., Bot. Mag., **t. 2068**. Elliott, Sketch, 1. 442. Torrey, Flora U. S., 388. Don's Mill., 2. 685. Dietr., Syn., 2. 1285.

Œ. suaveolens. Desf., "Tabl., 169." Persoon, Ench., 1. 408. Poir., Suppl., 4. 141. Seringe, DC. Prodr., 3. 46. Don's Mill., 2. 685. Dietr., Syn., 2. 1285.

Œ. Lamarckiana. Seringe, DC. Prodr., 3. 46. Don's Mill., 2. 685. Dietr., Syn., 2. 1285.

Var. HIRSUTISSIMA. Gray, Pl. Fendl., 43; Pl. Wright., 1. 69 and 2. 56. Torrey, Bot. Mex. Bound, 65. — No. 218 Fendler; 1066 Wright; 735 Thurber; 105, 712 Brewer; 27 Xantus; 268 Kell. & Harf.; Emory; Abert; Bolander; Kern; Sanderson.

Œ. odorata? Hook. & Arn., Bot. Beech., 343.

Œ. Hookeri. Torr. & Gray, Flora, 1. 493. Walpers, Repert., 2. 81.

Œ. biennis. Torrey, Emory's Rep., 140; Bot. Mex. Bound., 65. Gray, Pl. Xantus in Proc. Bost. Soc. Nat. Hist., 7. 146.

Var. CRUCIATA. Torr. & Gray, Flora, 1. 492. Gray, Manual, 178.

Œ. cruciata. Nuttall, MS. Don's Mill., 2. 686.

Var. CANESCENS. Torr. & Gray, Flora, 1. 492. Gray, Pl. Fendl., 43. Newberry, Pac. R. R. Rep., 6. 74.

? *Œ. pubescens*. Nees, Pl. Maxim. v. Wied, 9; not Willd.

Var. OAKESIANA. Gray, Manual, 178.

Œ. Oakesiana. Robbins, MS.

Var. MURICATA. Torr. & Gray, Flora, 1. 492. Gray, Manual, 178.

Œ. muricata. Linn., Syst., 12 ed., 296. Murr., " Comm. Gött., 6. 24, t. 1." Ait., Hort. Kew., 2 ed., 2. 341. Pursh, Flora, 261. Elliott, Sketch, 1. 441. Hornem., Fl. Dan., 10. t. 1752. Torrey, Flora U. S., 388. Seringe, DC. Prodr., 3. 46. Don's Mill., 2. 685. Ruprecht, " Bull. Acad. St. Petr., 14. 237 " ; (Bull. Soc. Bot. France, 3. 437.)

Onagra muricata. Moench., Methodus, 675.

Var. PARVIFLORA. Torr. & Gray, Flora, 1. 492. Gray, Manual, 178.

Œ. parviflora. Linn., Spec., 2 ed., 1. 492. Aiton, Hort. Kew., 2. 2. Lam., Dict., 4. 551. Persoon, Ench., 1. 408. Pursh, Flora, 261. Torrey, Flora U. S., 388. Seringe, DC. Prodr., 3. 47. Don's Mill., 2. 685. Dietr., Syn., 2. 1286.

65. ŒNOTHERA BILOBA. Durand, Pl. Pratten., 87. Torrey, Pac. R. R. Rep., 4. 86. — No. 1728 Hartweg; 109, 109 a Bridges; 6364 Bolander; Fremont; Fitch; Anderson; Gray.

Œ. tenella, Var. *tenuifolia.* Bentham, Pl. Hartw., 310.

41. ŒNOTHERA BISTORTA. Nuttall; Torr. & Gray, Flora, 1. 508. Torrey, Pac. R. R. Rep., 7. 11; Bot. Mex. Bound., 66. — No. 602 Thurber; 261 Kell. & Harf., in part; Nuttall; Newberry; Cooper.

? *Holostigma Bottæ.* Spach, Monog., 16.

Œ. heterophylla, Nutt. MS.; not Spach.

Sphærostigma bistorta. Walpers, Repert., 2. 77.

Œ. cheiranthifolia. Gray, Ives's Rep., 12.

Var. (?) VEITCHIANA. Hook., Bot. Mag., t. 5078. — Nuttall; Bigelow; Davidson; Wallace; Cooper.

Œ. graciliflora. Torrey, Pac. R. R. Rep., 4. 87; not Hook. & Arn.

38. ŒNOTHERA BOOTHII. Dougl.; Hook., Fl. Bor. Am., 1. 213. Don's Mill., 2. 84. Spach, Monog., 16. Torr. & Gray, Flora, 1. 509. Dietr., Syn., 2. 1285. Watson, King's Rep., 5. 110. — No. 419 Watson; Douglas; Nuttall; Bailey.

Œ. pygmæa. Dougl.; Hook., Fl. Bor. Am., 1. 213. Don's Mill., 2. 685. Spach, Monog., 16. Dietr., Syn., 2. 1285.

Œ. lithospermoides. Nutt., MS.

Sphærostigma Boothii. Walpers, Repert., 2. 77.

62. ŒNOTHERA BOTTÆ. Torr. & Gray, Flora, 1. 505. Dietr., Syn., 2. 1285. — No. 1729 Hartweg; 108 Bridges; 29, 29 a Xantus; 110 Torrey; 701 Brewer; Botta; Woodhouse; Parry; Wallace.

Godetia Bottæ. Spach, Monog., 73.

Œ. Californica. Dietr., Syn., 2. 1288.

Œ. rubicunda. Bentham, Pl. Hartw., 310. Gray, Pl. Xant., in Proc. Bost. Soc., 7. 146.

Œ. tenella. Gray, l. c.

22. Œ. BRACHYCARPA. Gray, Pl. Wright., 1. 70 and 2. 57; Proc. Amer. Acad., 8. 384. Torrey, Bot. Mex. Bound., 65. Walpers, Annal., 4. 676. — No. 1073 Wright; 364 Bigelow; ? [412 Watson; Pope; Henry; Howard.]

? *Œ. marginata,* Var. *purpurea.* Watson, King's Rep., 5. 108. Porter, Hayden's Rep., 1871, 483.

? *Œ. Wrightii,* q. v.

28. ŒNOTHERA BREVIFLORA. Torr. & Gray, Flora, 1. 506. Walpers, Repert., 2. 85. Watson, King's Rep., 5. 109. — No. 176 Hall & Harb.; 416 Watson; Nuttall; Fremont.

Taraxia breviflora. Nutt., MS.

Œ. Nuttallii. Torrey, Fremont's Rep., 89. Gray, Proc. Acad. Phil., 1863, 61.

48. ŒNOTHERA BREVIPES. Gray, Pac. R. R. Rep., 4. 87; Ives's Rep., 12. — No. 180 Coulter, in part; Newberry; Bigelow; Schott; Almendinger; Cooper.

Œ. clavœformis. Torrey, Bot. Mex. Bound., 66, in part.

19. ŒNOTHERA CÆSPITOSA. Nutt., "Fraser, Cat."; Genera, 1. 246. Sims, Bot. Mag., t. 1593. Pursh, Flora, 735. Seringe, DC. Prodr., 3. 46. Don's Mill., 2. 687. Torr. & Gray, Flora, 1. 500. Dietr., Syn., 2. 1287. Torrey, Nicollet's Rep., 150; Stansbury's Rep., 387. Hook., Pl. Geyer in Lond. Journ. Bot., 6. 223. Gray, Pac. R. R. Rep., 12. 43; Proc. Amer. Acad., 8. 384. Engelm., Pl. Upp. Miss., 191. Durand, Fl. Utah, 164. Porter, Hayden's Rep., 1870, 476. — No. 560 Fremont; 228 Fendler; 290 Thurber; 173 Hall & Harb.; 74, 292 Anderson; 242 Stretch; 411 Watson; 138 Eaton; 176 Vasey; Nuttall; Nicollet; Beckwith; Stansbury; Parry; Hill; Canby; Kell. & Harford.

Œ. scapigera. Pursh, Flora, 263. Link, Enum., 1. 377.

Pachylophis Nuttallii. Spach, Monog., 36, t. 30, fig. 1.

Œ. montana. Nutt.; Torr. & Gray, Flora, 1. 500. Walpers, Repert., 2. 83. Torrey, Fremont's Rep., 315; Stansbury's Rep., 387. Gray, Pl. Fendl., 45. Engelm., Pl. Upp. Miss., 191.

Œ. marginata. Nutt.; Hook. & Arn., Bot. Beech., 342. Torr. & Gray Flora, 1. 500; Pac. R. R. Rep., 2. 120. Walpers, Repert., 2. 83. Torrey, Stansbury's Rep., 387; Bot. Mex. Bound., 65. Gray, Proc. Acad. Phil., 1863, 61. Hook. f., Bot. Mag., t. 5828. Porter, Hayden's Rep., 1871, 483. Watson, King's Rep., 5. 108.

Œ. eximia. Gray, Pl. Fendl., 45; Ives's Rep., 11. Walpers, Annal., 2. 533.

24. ŒNOTHERA CANESCENS. Torrey, Fremont's Rep., 315; (Bot. Zeit., 5. 44.) Gray, Pl. Fendl., 44; Pl. Wright., 1. 70. Walpers, Annal., 1. 292. — No. 192 Fremont; 227 Fendler; Wislizenus; Newberry.

Œ. guttulata. Hook., Pl. Geyer in Lond. Jour. Bot., 6. 222.

49. ŒNOTHERA CARDIOPHYLLA. Torrey, Pac. R. R. Rep., 5. 360; Bot. Mex. Bound., 66. — Schott; Thomas; Du Barry; Palmer.

43. ŒNOTHERA CHAMÆNERIOIDES. Gray, Pl. Wright., 2. 58; Pl. Thurb., 298; Ives's Rep., 12. Walpers, Annal., 4. 677. Torrey, Bot. Mex. Bound., 66. — Nos. 38, 1377 Wright; 373 Bigelow; 174 Thurber; Parry; Palmer.

40. ŒNOTHERA CHEIRANTHIFOLIA. Hornem., "Hort. Hafn." Sprengel, Syst., 2. 228. Lindl., Bot. Reg., 12. t. 1040. Seringe, DC. Prodr., 3. 46. Don's Mill., 2. 684. Torr. & Gray, Flora, 1. 509. Dietr., Syn., 2. 1284. Bentham, Bot. Sulph., 15. Torrey, Pac. R. R. Rep., 7. 11. — No. 104 Bridges; 108 Torrey; 93 Bolander; Douglas; Rich.

Œ. spiralis. Hook., Fl. Bor. Am., 1. 214. Don's Mill., 2. 685. Spach, Monog., 16. Hook. & Arn., Bot. Beech., 141 and 341. Dietr., Syn., 2. 1285.

Holostigma cheiranthifolium. Spach, Monog., 15.

Sphærostigma cheiranthifolium. Fisch. & Meyer, Ind. Sem. h. Petr., 2. 25; (Litt. Ber. zu Linnæa, 1837, 120.) Gay, Fl. Chil., 2. 330.

Sphærostigma spirale. Fisch. & Meyer, l. c.

Œ. viridescens. Torrey, Pac. R. R. Rep., 4. 87.

Œ. contorta. Bolander, Catalogue, 12.

Var. SUFFRUTICOSA. — No. 153 Coulter; 250, 307 Brewer; Nuttall; Wallace; Rich.

Œ. viridescens. Hook., Fl. Bor. Am., 1. 214. Don's Mill., 2. 685. Spach, Monog., 16. Torr. & Gray, Flora, 1. 508. Bolander, Cat., 12.

Œ. maritima. Nutt., MS.

Sphærostigma viridescens. Walpers, Repert., 2. 77.

11. ŒNOTHERA CORONOPIFOLIA. Torr. & Gray, Flora, 1. 495. Walpers, Repert., 2. 80. Gray, Pl. Fendl., 43; Pl. Wright., 2. 57; Pac. R. R. Rep., 12. 43; Amer. Jour. Sci., 2. 34. 333; Proc. Acad. Phil., 1863, 61. Hook., Pl. Geyer in Lond. Jour. Bot., 6. 222. Torrey, Sitgreave's Rep., 159; Pac. R. R. Rep., 4. 86 and 7. 11; Bot. Mex. Bound., 65. Engelm., Pl. Upp. Miss., 191; Amer. Jour. Sci., 2. 34. 333. Porter, Hayden's Rep., 1870, 476. Watson, King's Rep., 5. 106. — Nos. 222, 225 Fendler; 178 Hall & Harb.; 407 Watson; 135 Eaton; 180, 181 Vasey; James; Nuttall; Abert; Engelmann; Kern; Meehan; Gray.

Œ. pinnatifida. James, Long's Exped., 2. 154; not Nuttall. Torrey, Ann. N. Y. Lyc., 2. 201.

66. ŒNOTHERA DENSIFLORA. Lindl., Bot. Reg., 19. **t. 1593**; (Litt. Ber. zu Linnæa, 1835, 15.) Torr. & Gray, Flora, 1. 505. Hook., Pl. Geyer in Lond. Jour. Bot., 6. 224. Torrey, Pac. R. R. Rep., 4. 86. Newberry, Pac. R. R. Rep., 6. 74. Bolander, Cat., 12. Gray, Proc. Amer. Acad., 8. 384, excl. vars. — No. 591 Geyer; 104 Torrey, in part; 26, 54, 118 Anderson; 811 Brewer; 185-188 Hall; Douglas; Lyall; Spalding; Gibbons; Bigelow; Fitch.

Boisduvalia Douglasii. Spach, Monog., 80, **t. 31, fig. 2.**

Œ. salicifolia and *imbricata.* Nutt., MS.

44. ŒNOTHERA DENTATA. Cav., Icon., 4. 67, **t. 398**. Ruiz & Pav., Fl. Peruv., 3. 81, **t. 317**. Seringe, DC. Prodr., 3. 46. Presl, Rel. Hænke, 2. 31. Torr. & Gray, Flora, 1. 511. Dietr., Syn., 2. 1284. Torrey, Pac. R. R. Rep., 4. 87. Gray, Ives's Rep., 12. — Nos. 166, 172 Fremont; 106 Bridges; 4844 Bolander; 262 Kell. & Harf.; Douglas; Bigelow; Parry; Wallace; Heermann.

Holostigma argutum. Spach, Monog., 13.

Sphærostigma dentatum. Walpers, Repert., 2. 78. Gay, Fl. Chil., 2. 326.

Var. CRUCIATA. — No. 1733 Hartweg; Stillman; Shelton; Fitch.

Œ. strigulosa. Bentham, Pl. Hartw., 310; not Torr. & Gray.

6. ŒNOTHERA DRUMMONDII. Hook., Bot. Mag., **t. 3361**; (Ann. Sci. Nat., 2. 5. 296.) Spach, Monog., 28. Torr. & Gray, Flora, 1. 493. Dietr., Syn., 2. 1290. Walpers, Repert., 2. 81. Torrey, Fremont's Rep., 89. Gray, Pl. Lindh., 8 and 189. Scheele, Roemer's Texas, 430. — No. 80 Drummond; 53 Lindheimer; 99 Schott; ? 53 Xantus; Berlandier.

? *Œ. sinuata*, Var. *humifusa*. Gray, Proc. Amer. Acad., 5. 158.

63. ŒNOTHERA EPILOBIOIDES. Nutt.; Torr. & Gray, Flora, 1. 511. Walpers, Repert., 2. 78. — No. 534 Thurber; 45 Beckwith; 108 a Bridges; 252 Anderson; 272 Stretch; 6366 Bolander; 192 Hall; Nuttall; Bigelow; Gray; Kell. & Harford.

Œ. rubicunda. Torrey, Pac. R. R. Rep., 2. 121.

Œ. tenella, Var. *tenuifolia*. Torrey, Pac. R. R. Rep., 4. 86.

Œ. vinosa. Torrey, Bot. Mex. Bound., 66.

Œ. viminea. Watson, King's Rep., 5. 108.

Œ. tenella. Gray, Proc. Amer. Acad., 8. 384.

25. ŒNOTHERA FREMONTII. — No. 363 Bigelow; Fremont; Parry.

Œ. Wrightii. Torrey, Bot. Mex. Bound., 65, in part.

15. ŒNOTHERA FRUTICOSA. Linn., Spec., 346. Ait., Hort. Kew., 2. 4. Pursh, Flora, 262. Nutt., Genera, 1. 247. Elliott, Sketch, 1. 442. Torrey, Flora U. S., 389; Flora N. York, 1. 234. Hook., Fl. Bor. Amer., 1. 212; Bot. Mag., under t. 3548, in part. Torr. & Gray, Flora, 1. 496. Chapman, Flora, 139. Gray, Manual, 179.

Œ. mollissima. Walter, Fl. Car., 129; not Linn.

Œ. tetragona. Roth, Cat. Bot., 2. 39; Beiträg. Bot., 1. 200; Ann. Bot., 2. 30. Seringe, DC. Prodr., 3. 52. Don's Mill., 2. 691.

Œ. hybrida. Michx., Flora, 1. 225. Pursh, Flora, 262. Elliott, Sketch, 1. 442. Seringe, DC. Prodr., 3. 50. Dietr., Syn., 2. 1288.

Kneiffia suffruticosa and *floribunda*. Spach, Monog., 45 and 46.

Var. LINEARIFOLIA. Hook., Bot. Mag., under t. 3545. — No. 78 Drummond; 54 Lindheimer; 126 Palmer; 210 Hall; Nuttall; Wright; Pitcher; Leavenworth.

Œ. linearis. Michx., Flora, 1. 225. Pursh, Flora, 262. Nutt., Genera, 1. 248. Elliott, Sketch, 1. 444. Seringe, DC. Prodr., 3. 51. Torr. & Gray, Flora, 1. 497. Chapman, Flora, 139. Gray, Manual, 179, in part.

? *Œ. media*. Link, Enum. Berol., 1. 377. Seringe, DC. Prodr., 3. 49. Dietr., Syn., 2. 1286.

Œ. riparia. Nutt., Genera, 1. 247. Seringe, DC. Prodr., 3. 52. Torr. & Gray, Flora, 1. 497. Chapman, Flora, 139. Gray, Manual, 179.

Kneiffia angustifolia and ? *maculata*. Spach, Monog., 46 and 47.

Onagra Linkiana. Spach, Monog., 34.

Var. HUMIFUSA. Allen, Bull. Torr. Bot. Club, 1. 2.

Œ. linearis, var. Torr. & Gray, Flora, 1. 497.

Œ. linearis. Gray, Manual, 179, in part.

Var. AMBIGUA. Nutt., Genera, 1. 247. Torrey, Flora U. S., 389. Hook., Bot. Mag., t. 3545. Torr. & Gray, Flora, 1. 496.

Œ. ambigua. Spreng., Syst., 2. 229. Seringe, DC. Prodr., 3. 50. Dietr., Syn., 2. 1289.

Œ. Canadensis. Goldie, "Edinb. Phil. Jour., 1822." Seringe, DC. Prodr., 3. 52.

Var. PHYLLOPUS. Hook., Fl. Bor. Am., 1. 212. Torr. & Gray, Flora, 1. 496.

Œ. fruticosa. Sims, Bot. Mag., t. 332.

Œ. serotina. Don; Sweet's Brit. Fl. Gard., t. 184. Sweet, "Hort. Brit., t. 152." Lindl., Bot. Reg., 22. t. 1840. Don's Mill., 2. 689.

Var. INCANA. Hook., Fl. Bor. Am., 1. 212. Torr. & Gray, Flora, 1. 496.

Œ. incana. Nutt., Genera, 1. 247. Torrey, Flora U. S., 389. Spreng., Syst., 2. 229. Seringe, DC. Prodr., 3. 52. Don's Mill., 2. 690.

Var. HIRSUTA. Nutt.; Torr. & Gray, Flora, 1. 496.

Œ. pilosella. Raf., Ann. Nat., 15.

39. ŒNOTHERA GAURÆFLORA. Torr. & Gray, Flora, 1. 510. Torr., Bot. Mex. Bound., 66. Gray, Ives's Rep., 12. — No. 337 Fremont, in part; 273 a Schott; 579, 1218 Brewer; Douglas; Newberry; Cooper; Andrews.

Gaura decorticans. Hook. & Arn., Bot. Beech., 343.

Sphærostigma gauræflora. Walpers, Repert., 2. 78.

Œ. Nevadensis. Kellogg, Proc. Acad. Calif., 2. 224, fig. 70.

68. ŒNOTHERA GLABELLA. Nutt.; Torr. & Gray, Flora, 1. 505. Watson, King's Rep., 5. 108. Gray, Proc. Amer. Acad., 8. 384. — No. 413 Watson; 190 Hall; Nuttall.

16. ŒNOTHERA GLAUCA. Michx., Flora, 1. 224. Pursh; Sims, Bot. Mag., t. 1606; Flora, 262. Nutt., Genera, 1. 247. Seringe, DC. Prodr., 3. 50. Lindl., Bot. Reg., 18. t. 1511. Torr. & Gray, Flora, 1. 497. Chapman, Flora, 138. Gray, Manual, 179.

Kneiffia glauca. Spach, Monog., 45.

Var. FRASERI. Torr. & Gray, Flora, 1. 497.

Œ. Fraseri. Pursh; Sims, Bot. Mag., t. 1674; Flora, 2. 734. Elliott, Sketch, 1. 443. Seringe, DC. Prodr., 3. 51. Dietr., Syn., 2. 1289.

Kneiffia Fraseri. Spach, Monog., 46.

Œ. fruticosa, Var. *Fraseri.* Hook., Bot. Mag., under t. 3548.

32. ŒNOTHERA GRACILIFLORA. Hook. & Arn., Bot. Beech., 341. Torr. & Gray, Flora, 1. 507. Hook., Icones, t. 338. Walpers, Repert., 2. 86. Bentham, Pl. Hartw., 310. Bolander, Cat., 12. — No. 173 Coulter; 1732 Hartweg; 218 Fremont; 1109 Brewer; 4564, and c. Bolander; 259 Kell. & Harf.; Douglas; Stillman; Rich.

52. ŒNOTHERA GRANDIFLORA. — No. 6534 Bolander; 274 Kell. & Harford.

Godetia grandiflora. Lindl., Bot. Reg., 27, Misc., 61, and 28. t. 61; not Aiton.

Œ. Whitneyi. Gray, Proc. Amer. Acad., 7. 340 and 400. Hook. f., Bot. Mag., t. 5867. Bolander, Cat., 12.

34. ŒNOTHERA GREGGII. Gray, Pl. Fendl., 46; Pl. Wright., 1. 72. Walpers, Annal., 2. 533. — No. 199 Wright; 30 Gordon; Gregg.

Œ. Lampasana. Buckley, Proc. Phil. Acad., 1861, 454.

Œ. Hartwegi, var. Gray, Proc. Phil. Acad., 1862, 163.

33. ŒNOTHERA HARTWEGI. Bentham, Pl. Hartw., 5. Gray, Pl. Fendl., 46; Pl. Wright., 1. 72 and 2. 58. Torrey, Sitgreave's Rep., 159; Bot. Mex. Bound., 66. — No. 10 Hartweg; 33, 303 Gregg; 196, 198, 1075, 1093 Wright; 123 Thurber; 369 Parry; 27 Edwards & Eaton; Schott.

Var. LAVANDULÆFOLIA. — No. 1074 Wright; 16 Geyer; 368 Bigelow; 77, 115 Parry; 62 Hall; James; Nuttall; Gregg; Engelmann.

Œ. insignis. Nutt., MS.

Œ. lavandulæfolia. Torr. & Gray, Flora, 1. 501; Pac. R. R. Rep., 2. 164. Walpers, Repert., 2. 85. Gray, Pl. Fendl., 46; Pl. Wright., 1. 72 and 2. 58; Amer. Jour. Sci., 2. 33. 405. Hook., Pl. Geyer in Lond. Journ. Bot., 6. 223. Torrey, Marcy's Rep., 285; Bot. Mex. Bound., 66. Engelm., Pl. Upp. Miss., 192.

Var. FENDLERI. Gray, Pl. Wright., 1. 72 and 2. 58; Pl. Thurb., 300. Torr. & Gray, Pac. R. R. Rep., 2. 164. — No. 230 Fendler; 1076 Wright; 265 Thurber; 130 Palmer; Smith.

Œ. Fendleri. Gray, Pl. Fendl., 45. Walpers, Annal., 2. 533.

30. ŒNOTHERA HETERANTHA. Nuttall, Journ. Acad. Phil., 7. 22. Torr. & Gray, Flora, 1. 507. Walpers, Repert., 2. 86. Gray, Pl. Fendl., 45; Pl. Wright., 1. 70. Watson, King's Rep., 5. 110. Porter, Hayden's Rep., 1871, 483. — No. 406 Geyer; 418 Watson, in part; 139 Eaton; Wyeth.

Jussiæa subacaulis. Pursh, Flora, 1. 304.

Œ. triloba. Hook., Pl. Geyer in Lond. Journ. Bot., 6. 223; not Nuttall.

Var. (?) TARAXACIFOLIA. — No. 418 Watson, in part.

3. ŒNOTHERA HETEROPHYLLA. — Spach, Monog., 28. Walpers, Repert., 2. 81. — No. 74 Drummond; 1842 Berlandier; 56 Lindheimer; 201 Hall; Wright; Linsecum; Buckley.

Œ. bifrons. Don, Sweet's Brit. Fl. Gard., 2 ser., **t. 386**. Hook., Bot. Mag., **t. 3764**. Torr. & Gray, Flora, 1. 492. Dietr., Syn., 2. 1290. Walpers, Repert., 2. 81. Gray, Pl. Wright., 1. 69; Proc. Acad. Phil., 1862, 163; Hall's Pl. Tex., 9.

Œ. rhombipetala. Engelm. & Gray, Pl. Lindh., 8. Dur. & Hilg., Pac. R. R. Rep., 5. 7.

Œ. Leona. Buckley, Proc. Acad. Phil., 1861, 163.

64. ŒNOTHERA HISPIDULA. — No. 307, and Ppp., Fremont; 32 Rattan; Pratten.

Œ. rubicunda. Durand, Pl. Pratten., 87.

5. ŒNOTHERA HUMIFUSA. Nutt., Genera, 1. 245. Spreng., Syst., 2. 228. Seringe, DC. Prodr., 3. 47. Don's Mill., 2. 687. Spach, Monog., 30.

Œ. sinuata, Var. *humifusa.* Torr. & Gray, Flora, 1. 494. Chapman, Flora, 138.

2. ŒNOTHERA JAMESII. Torr. & Gray, Flora, 1. 493. Walpers, Repert., 2. 81. Gray, Pl. Lindh., 189; Pl. Wright., 1. 69. Torrey, Sitgreave's Rep., 175; Pac. R. R. Rep., 4. 86; Bot. Mex. Bound., 65. — No. 375 and 502 Lindheimer; 189 Wright; 63 Thurber; 357 Parry; James.

54. ŒNOTHERA LEPIDA. Hook. & Arn., Bot. Beech., 342. Torr. & Gray, Flora, 1. 504. Dietr., Syn., 2. 1287. Bentham, Pl. Hartw., 310. Torrey, Pac. R. R. Rep., 4. 86. Gray, Pac. R. R. Rep., 12. 61. — No. 1727 Hartweg; 282 Bolander, in part; 690 Brewer; Nuttall; Bigelow; Pratten; Hulse.

Godetia lepida. Lindl., Bot. Reg., 22. **t. 1849**.

Œ. purpurea. Durand, Pl. Pratten., 88, in part.

Var. PARVIFLORA. — Nos. 441, 484 Fremont; 194 Hall, and 188, in part; 266, 269 Kell. & Harf.; Douglas; Tolmie; Shelton; Fitch; Bigelow; Willey.

Œ. decumbens. Dougl.; Hook., Bot. Mag., **t. 2889.** Lindl., Bot. Reg., 15. **t. 1221.** Lehm., Hook. Fl. Bor. Am., 1. 211. Don's Mill., 2. 688. Torr. & Gray, Flora, 1. 504. Dietr., Syn., 2. 1287. Durand, Pl. Pratten., 87.

Godetia decumbens. Spach, Monog., 68, **t. 30, fig. 2.**

Œ. viminea. Torrey, Pac. R. R. Rep., 4. 86, in part.

Œ. densiflora, var. Gray, Proc. Amer. Acad., 8. 384, in part.

Var. Arnottii. — No. 104 Torrey, in part; 193 Hall, in part; Douglas; Bolander.

Œ. viminea, var. Hook. & Arn., Bot. Beech., 342.

Œ. Arnottii. Torr. & Gray, Flora, 1. 503.

12. ŒNOTHERA LINIFOLIA. Nuttall, Journ. Acad. Phil., 2. 120; (Litt. Ber. zu Linnæa, 1829, 40.) Seringe, DC. Prodr., 3. 50. Don's Mill., 2. 691. Torr. & Gray, Flora, 1. 499. Dietr., Syn., 2. 1288. Engelm. & Gray, Pl. Lindh., 8. Chapman, Flora, 139. Gray, Hall's Pl. Texan., 9. — No. 78 Drummond; 54 Lindheimer; 210 Hall; Wright; Leavenworth.

Kneiffia linifolia. Spach, Monog., 48.

27. ŒNOTHERA MACROSCELES. Gray, Pl. Fendl., 43. Walpers, Annal., 2. 533. — Gregg.

42. ŒNOTHERA MICRANTHA. Hornem., "Hort. Hafn." Spreng., Syst., 2. 228. Hook. & Arn., Bot. Beech., 341. Torr. & Gray, Flora, 1. 509. — Nos. 155, 221, 282, 320, 324, 391, 443, 446, 988, 1137 Brewer; 6363, 6420 Bolander; 28 Xantus; 261 Kell. & Harf., in part; Douglas; Nuttall; Fremont; Wallace; Gibbons; Torrey.

Œ. dentata. Seringe, DC. Prodr., 3. 46, in part; not Cav.

Œ. hirta. Link, "Enum., 1. 378." Don's Mill., 2. 684.

Sphærostigma hirtum. Fisch. & Mey., Ind. Sem. h. Petr., 2. 25; (Litt. Ber. zu Linnæa, 1837, 120.)

Holostigma micranthum. Spach, Monog., 15.

Sphærostigma micranthum. Walpers, Repert., 2. 77.

Œ. asperifolia. Nutt., MS.

Œ. cheiranthifolia. Torrey, Pac. R. R. Rep., 4. 87.

Œ. strigulosa. Torrey, Pac. R. R. Rep., 4. 87, in part.

Œ. bistorta. Gray, Pl. Xantus in Proc. Bost. Soc., 7. 146.

26. ŒNOTHERA MISSOURIENSIS. Sims, Bot. Mag., **t. 1592,** and under t. 1674. Don's Mill., 2. 689. Torr. & Gray, Flora, 1. 500; Pac. R. R. Rep., 2. 164. Torrey, Fremont's Rep., 89 and 315; Pac. R. R. Rep., 4. 86; Bot. Mex. Bound., 65, in part. Gray, Pl. Lindh., 188; Pl. Wright., 1. 70; Proc. Acad. Phil., 1863, 61; Hall's Pl. Tex., 9. Engelm., Wislizenus's Report, 3. Wood, Classbook, 353. — Nos. 81, 108 Fremont; 43 Fendler; 255, 391 Lindheimer; 194 Wright; 362 Bigelow; 31 Gordon; 174 Hall & Harb.; 131 Palmer; 207 Hall; James; Gleason; Greene.

Megapterium Missouriense. Spach, Monog., 31.

Œ. Drummondii. Hook., Pl. Geyer in Lond. Journ. Bot., 6. 221.

Var. LATIFOLIUM. Gray, Pl. Lindh., 188.

Œ. macrocarpa. Pursh, Flora, 734. James, Long's Exped., 2. 324. Torrey, Ann. N. Y. Lyc., 2. 201. Sweet, Brit. Fl. Gard., **t. 5.** Spreng., Syst., 2.

229. Seringe, DC. Prod., 3. 47. Don's Mill., 2. 689. Dietr., Syn., 2. 1286. Scheele, Römer's Texas, 430.

Œ. alata. Nutt., Genera, 1. 248.

Megapterium Nuttallii. Spach, Monog., 31.

Var. INCANA. Gray, Pl. Lindh., 189. Torrey, Pac. R. R. Rep., 4. 86.

50. ŒNOTHERA MULTIJUGA. Watson, Amer. Naturalist, 7. 300. — Thompson.

29. ŒNOTHERA NUTTALLII. Torr. & Gray, Flora, 1. 506. Walpers, Repert., 2. 86. Watson, King's Rep., 5. 110. — No. 43 Beckwith; 417 Watson; Nuttall; Newberry; Cronkhite; Lyall; Anderson; Stretch; Bolander & Kellogg.

Taraxia longifolia. Nutt., MS.

Œ. tanacetifolia. Torr. & Gray, Pac. R. R. Rep., 2. 121, **t. 4**; (Nuremberg Flora, 41. 622.) Newberry, Pac. R. R. Rep., 6. 74. Watson, King's Rep., 5. 110.

31. ŒNOTHERA OVATA. Nutt.; Torr. & Gray, Flora, 1. 507. Walpers, Repert., 2. 86. Bentham, Pl. Hartw., 310. Torrey, Pac. R. R. Rep., 4. 87. Bolander, Cat., 12. — No. 125 Fremont; 1731 Hartw.; 902 Brewer; 260 Kell. & Harf.; d. Bolander; Nuttall; Bigelow; Bloomer.

8. ŒNOTHERA PINNATIFIDA. Nutt., Genera, 1. 245. Spreng., Syst., 2. 229. Torr. & Gray, Flora, 1. 494. Dietr., Syn., 2. 1289. Walpers, Repert., 2. 79. Torrey, Nicollet's Rep., 150. Nees, Pl. Maxim., 9. Gray, Pl. Fendl., 43; Amer. Jour. Sci., 2. 34. 333; Proc. Phil. Acad., 1863, 61. Hook., Pl. Geyer in Lond. Journ. Bot., 6. 221. Engelm., Pl. Upp. Miss., 191; Amer. Jour. Sci., 2. 34. 333. Porter, Hayden's Rep., 1870, 476. — Nos. 46, 267 Fremont; 223 Fendler; 201 Nicollet; 1069, 1070 Wright; 279 Thurber; 359 Bigelow; 116 Parry; 177 Hall & Harb.; 179 Vasey; 121 Greene; Bradbury; Nuttall; Newberry; Schott; Kern; Smith; Henry; Howard; Gray; and others.

Œ. albicaulis. Pursh, Flora, 733; not Nuttall. Seringe, DC. Prodr., 3. 51. Torrey, Bot. Mex. Bound., 65. Gray, Ives's Rep., 11; Amer. Jour. Sci., 2. 33. 405, in part.

Œ. Bradburiensis. Nutt., MS.

Œ. Purshiana. Steud., Nomenclator, 2. 207.

Œ. Purshii. Don's Mill., 2. 688.

Œ. coronopifolia. Gray, Pl. Wright., 2. 56; not Torr. & Gray.

20. ŒNOTHERA PRIMIVERIS. Gray, Pl. Wright., 2. 58; Pl. Thurb., 298; Ives's Rep., 11. Walpers, Annal., 4. 677. Torrey, Bot. Mex. Bound., 65. — No. 1376 Wright.; 366 Parry; Newberry.

51. ŒNOTHERA PTEROSPERMA. Watson, King's Rep., 5. 112, **t. 14**. — No 424 Watson.

14. ŒNOTHERA PUMILA. Linn., Spec., 2 ed., 493. Aiton, Hort. Kew., 2. 4. Curtis, Bot. Mag., **t. 355**. Pursh, Flora, 262. Elliott, Sketch, 1. 444. Hook., Fl. Bor. Am., 1. 212. Torr. & Gray, Flora, 1. 498. Chapman, Flora, 139. Bourgeau, Palliser's Rep., 256. Gray, Manual, 179. — Bourgeau.

Œ. pusilla. Michx., Flora, 1. 225. Pursh, Flora, 263. Nutt., Genera, 1. 248. Torrey, Flora U. S., 390. Seringe, DC. Prodr., 3. 51. Don's Mill., 2. 690.

Œ. chrysantha. Michx., Flora, 1. 225. Pursh, Flora, 263. Elliott, Sketch, 1. 444. Torr. & Gray, Flora, 1. 498. Torrey, Flora New York, 1. 235. Matthews, Fl. Acadia, 20. Gray, Manual, 179.

Œ. gracilis. Schrad., "Ind. Sem. h. Gött."

Œ. riparia. Lehm.; Hook., Fl. Bor. Am., 1. 212; not Nutt.

Kneiffia pumila and *chrysantha.* Spach, Monog., 47 and 48, excl. vars.

53. ŒNOTHERA PURPUREA. Curtis, Bot. Mag., t. **352.** Willd., Spec., 2. 311. Persoon, Ench., 1. 409. Ait., Hort. Kew., 2 ed., 2. 344. Seringe, DC. Prodr., 3. 49. Hook., Fl. Bor. Am., 1. 211. Don's Mill., 2. 688. Hook. & Arn., Bot. Beech., 341. Torr. & Gray, Flora, 1. 504. Dietr., Syn., 2. 1287. Bentham, Bot. Sulph., 15. Bolander, Cat., 12. Gray, Proc. Amer. Acad., 8. 384, in part. — No. 108 b. Bridges; 410 Bolander, and 282, in part; 193 Hall, in part; Douglas; Rich; Willey.

Œ. humilis. Donn, "Ind. h. Cant., 41." Poir., Suppl., 4. 144.

Godetia Willdenowiana. Spach, Monog., 68.

57. ŒNOTHERA QUADRIVULNERA. Dougl.; Lindl., Bot. Reg., 13. t. **1119.** Lehm.; Hook., Fl. Bor. Am., 1. 213. Don's Mill., 2. 684. Torr. & Gray, Flora, 1. 504. Dietr., Syn., 2. 1285. Gray, Pac. R. R. Rep., 12. 61. — No. 533 Thurber, in part; 477, 2538 Brewer; 106 Torrey, in part; 270 Kell. & Harf.; Douglas; Nuttall; Tolmie; Wilkes; Pratten; Scouler; Williams; Bigelow; Suckley; Kellogg.

Godetia quadrivulnera. Spach, Monog., 69.

Œ. tenella, Var. *tenuifolia.* Hook. & Arn., Bot. Beech., 342, in part. Torr. & Gray, Flora, 1. 504.

Œ. viminea. Torrey, Pac. R. R. Rep., 4. 86, in part.

Œ. purpurea. Durand, Pl. Pratten., 88, in part.

4. ŒNOTHERA RHOMBIPETALA. Nutt.; Torr. & Gray, Flora, 1. 493. Walpers, Repert., 2. 81. Torrey, Fremont's Rep., 89; Marcy's Rep., 285; Sitgreave's Rep., 175. Kunze, Linnæa, 20. 57. Parry, Pl. Minnesota, 612. Engelm., Pl. Upp. Miss., 192. Gray, Manual, 178. — Fremont; Leavenworth; Parry.

Œ. Darlingtonii. Pickering, MS.

60. ŒNOTHERA ROMANZOVII. Ledeb., "Hornem. Hort. Hafn., 1. 133." Don; Lindl., Bot. Reg., 7. t. **562**; (Spreng., Neue Entdeck., 3. 176). "Link, Enum., 378." Spreng., Syst., 2. 228. Seringe, DC. Prodr., 3. 49. Hook., Fl. Bor. Am., 1. 212. Don's Mill., 2. 688. Torr. & Gray, Flora, 1. 503. Dietr., Syn., 2. 1287.

Godetia Romanzovii. Spach, Monog., 70.

18. ŒNOTHERA ROSEA. Aiton, Hort. Kew., 2. 3. Curtis, Bot. Mag., t. **347.** Seringe, DC. Prodr., 3. 51. Don's Mill., 2. 689. Gray, Pl. Wright., 2. 57. Torrey, Bot. Mex. Bound., 65. — No. 165 Coulter; 254, 651 Gregg; 1071 Wright; 361 Schott; 347, 699 Thurber.

Œ. rubra. Cav., Icones, 4. 68, t. **400.**

Œ. purpurea. Lam., Dict., 4. 554.

Hartmannia gauroides. Spach, Monog., 41.

47. ŒNOTHERA SCAPOIDEA. Nutt.; Torr. & Gray, Flora, 1. 506. Walpers, Repert., 2. 86. Hook., Pl. Geyer in Lond. Journ. Bot., 6. 224. Torrey, Stansbury's Rep., 387, in part. Durand, Fl. Utah, 164. Watson, King's Rep., 5. 109. — No. 94 Geyer; 96 Palmer; 414 Watson; Nuttall; Stansbury.

Var. PURPURASCENS. — No. 1845 Brewer; 415 Watson; 70 Anderson; Beckwith; Stretch.

Œ. clavæformis. Torr. & Gray, Pac. R. R. Rep., 2. 121.

Œ. cruciformis. Kellogg, Proc. Acad. Calif., 2. 227, fig. 71.

Œ. scapoidea, Var. *clavæformis.* Watson, King's Rep., 5. 109.

Var. AURANTIACA. — No. 180 Coulter, in part; 374 Parry; Fremont; Bigelow; Newberry; Cooper; Thomas; Almendinger.

Œ. clavæformis. Torrey, Fremont's Rep., 314; (Bot. Zeit., 5. 42;) Pac. R. R. Rep., 4. 86 and 5. 360; Bot. Mex. Bound., 66, in part. Walpers, Annal., 1. 291. Gray, Ives's Rep., 12.

36. ŒNOTHERA SERRULATA. Nutt., Genera, 1. 246. Torrey, Ann. N. Y. Lyc., 2. 201. Sweet, Brit. Fl. Gard., t. 133. Spreng., Syst., 2. 228. Seringe, DC. Prodr., 3. 49. Don's Mill., 2. 687. Torr. & Gray, Flora, 1. 501; Pac. R. R. Rep., 2. 164. Dietr., Syn., 2. 1286. Torrey, Nicollet's Rep., 150; Fremont's Rep., 89; Marcy's Rep., 285; Pac. R. R. Rep., 4. 86; Bot. Mex. Bound., 65. Engelm., Wislizenus's Rep., 3; Pl. Upp. Miss., 191. Parry, Fl. Minnesota, 612. Gray, Pac. R. R. Rep., 12. 43; Proc. Acad. Phil., 1863, 61; Manual, 179. Bourgeau, Palliser's Rep., 256. Porter, Hayden's Rep., 1870, 476. — No. 192 Nicollet; 17, 201, 455 Fremont; 1957 Berlandier; 229 Fendler; 179 Hall & Harb.; 182 Vasey; 61 Houghton; James; Nuttall; Franklin; Marcy; Beckwith; Thurber; Suckley; Bourgeau; Engelmann; Lesquereux; Kern; Buckley; Hale.

Calylophis Nuttallii. Spach, Monog., 17.

Œ. fruticosa. Gray, Pl. Fendl., 44.

Meriolix serrulata. Walpers, Repert., 2. 79; Annal., 2. 532.

Var. PINIFOLIA. Engelm.; Gray, Pl. Lindh., 189; Hall's Pl. Tex., 9. — No. 567, 1048, 2478 Berlandier; 394 Lindheimer; 209 Hall.

Œ. capillifolia. Scheele, Linnæa, 21. 576.

Var. DOUGLASII. Torr. & Gray, Flora, 1. 502; Pac. R. R. Rep., 2. 126. Gray, Pl. Fendl., 45. Hook., Pl. Geyer in Lond. Journ. Bot., 6. 224.

Œ. leucocarpa. Lehm.; Hook., Fl. Bor. Am., 1. 210; Nov. Stirp., pug. 2. 17. Don's Mill., 2. 687. Dietr., Syn., 2. 1287.

Var. DRUMMONDII. Torr. & Gray, Flora, 1. 502.

Calylophis Drummondiana and ? *Berlandieri.* Spach, Monog., 18.

Meriolix Berlandieri. Walpers, Repert., 2. 79.

Œ. spinulosa, Var. *Drummondii.* Engelm., Pl. Upp. Miss., 192.

Var. SPINULOSA. Torr. & Gray, Flora, 1. 502. Gray, Pl. Lindh., 36 and 189; Pl. Wright., 1. 71; Hall's Pl. Tex., 9. Scheele, Römer's Texas, 430. — Nos. 479, 1829, 1919 Berlandier; 79 Drummond; 238, 393 Lindheimer; 195 Wright; 208 Hall; Nuttall; Fremont; Hobart.

Œ. spinulosa. Nutt., MS.

Œ. serrulata. Nutt., Journ. Acad. Phil., 2. 120; (Litt. Ber. zu Linnæa, 1829, 40.) Hook., Exot. Fl., t. 140.

7. ŒNOTHERA SINUATA. Linn., Mant., 2. 228. Murr., "Comm. Gött., 5, t. 9." Ait., Hort. Kew., 2. 3. Michx., Flora, 1. 224. Pursh, Flora, 261. Elliott, Sketch, 1. 443. Spach, Monog., 29. Hook., Comp. Bot. Mag., 1. 25. Torr. & Gray, Flora, 1. 494; Pac. R. R. Rep., 2. 164. Bentham, Pl. Hartw., 6. Scheele,

Römer's Texas, 431. Torrey, Marcy's Rep., 285; Bot. Mex. Bound., 65. Lesquereux, Fl. Ark., 360. Chapman, Flora, 138. Gray, Manual, 178; Hall's Pl. Tex., 9. — Nos. 166, 170 Coulter; 1066, 2496 Berlandier; 11 Hartweg; 221, 244 Fendler; 368 Lindheimer; 133 Palmer; 677 Ghiesbrecht; 206 Hall.

Œ. laciniata. Hill, " Syst. Veg., 12, Appx., and plate"; Hort. Kew., 172[1], t. 6.

Onagra sinuata. Moench., Methodus, 676.

Œ. prostrata. Ruiz & Pav., Fl. Peru., 3. 79, t. 315. DC. Prodr., 3. 48.

? *Œ. viscosa*. Raf., Fl. Lud., 96.

Var. MINIMA. Nutt., Genera, 1. 245. Hook., Bot. Mag., t. 3392; Pl. Geyer in Lond. Journ. Bot., 6. 221. — No. 134 Palmer.

Œ. minima. Pursh, Flora, 262, t. 15. Spreng., Syst., 2. 228. Seringe, DC. Prodr., 3. 49. Don's Mill., 2. 687. Spach, Monog., 29.

Var. HIRSUTA. Torr. & Gray, Flora, 1. 494. Gray, Pl. Fendl., 43; Hall's Pl. Tex., 9. — No. 75 Drummond; 202 Hall; Nuttall; Linsecum.

Œ. Mexicana. Spach, Monog., 27. Walpers, Repert., 2. 81.

Var. GRANDIFLORA. — No. 132 Palmer; 203 Hall; Wright.

? *Œ. longiflora*. Scheele, Römer's Texas, 430; not Jacq.

Œ. sinuata. Gray, Hall's Pl. Tex., 9, in part.

13. ŒNOTHERA SPACHIANA. Torr. & Gray, Flora, 1. 498; Pac. R. R. Rep., 2. 164. Walpers, Repert., 2. 84. Gray, Pl. Wright., 1. 70; Hall's Pl. Tex., 9. — No. 81 Drummond, in part; 206 Hall; Lindheimer; Wright; Pope; Hall.

Blennoderma Drummondii. Spach, Monog., 86.

Œ. Drummondii. Walpers, Repert., 2. 85; not Hook.

? *Œ. uncinata*. Scheele, Linnæa, 21. 578. Gray, Pl. Lindh., 190. Walpers, Annal., 2. 534.

17. ŒNOTHERA SPECIOSA. Nutt., Journ. Acad. Phil., 2. 119; (Litt. Ber. zu Linnæa, 1829, 40.) Hook., Exot. Flora, 2. t. 80; Bot. Mag., t. 3189. Spreng., Syst., 2. 230. Seringe, DC. Prodr., 3. 50. Don; Sweet, Brit. Fl. Gard., t. 253. Don's Mill., 2. 688. Torr. & Gray, Flora, 1. 496; Pac. R. R. Rep., 2. 126 and 164. Dietr., Syn., 2. 1289. Walpers, Repert., 2. 85. Torrey, Fremont's Rep., 89; Marcy's Rep., 285; Pac. R. R. Rep., 4. 86. Gray, Pl. Fendl., 44; Pl. Lindh., 8 and 31 and 189; Pl. Wright., 1. 70; Hall's Pl. Tex, 9. Engelmann, Wislizenus's Rep., 3. Scheele, Römer's Texas, 431. — Nos. 187, 869, 1087, 1447, 1484, 1833, 2326, 2433, 2517 Berlandier; 78, 79 Drummond, and 81, in part; 35, 55, 409 Lindheimer; 415, 440 Wright; 370 Schott; 127 Palmer; Nuttall; Gregg; Fremont; Pitcher; Thurber; Hobart; Hale.

Xylopleurum hirsutum, Nuttallii, Drummondii, and *obtusifolium*. Spach, Monog., 50-52.

Œ. Spachii and *obtusifolia*. Dietr., Syn., 2. 1289.

Œ. Drummondii. Schnitzlein, Icon., t. 265, f. 1; not Hook.

45. ŒNOTHERA STRIGULOSA. Torr. & Gray, Flora, 1. 512. Dietr., Syn., 2. 1284. Torrey, Pac. R. R. Rep., 4. 87, in part, [and 7. 11 ?] — No. 694 Wilkes; 407, 2590 Brewer; Nuttall; Spalding; Bigelow; Rich; Fitch.

Sphærostigma strigulosum. Fisch. & Mey., Ind. Sem. h. Petr., 2. 25; (Ann. Sci. Nat., 2. 5. 187; Litt. Ber. zu Linn., 1837, 120; Hook., Comp. Bot. Mag., 2. 9.) Walpers, Repert., 2. 79.

Œ. contorta. Hook., Fl. Bor. Am., 1. 214. Don's Mill., 2. 685. Spach, Monog., 16. Torr. & Gray, Flora, 1. 511. Dietr., Syn., 2. 1285. [? Hook., Pl. Geyer in Lond. Journ. Bot., 6. 224.]

Œ. parvula. Nutt.; Torr. & Gray, Flora, 1. 511.

Sphærostigma contortum and *parvulum.* Walpers, Repert., 2. 78.

Var. PUBENS. — No. 219 Fremont; 181 Stretch; 99, 155 Anderson; 100 Torrey; 276, 498, 550, 715, 3934 Brewer; 3857, 3954, 6419 Bolander; 422, 423 Watson; Bigelow; Suckley; Spalding; Lyall; Fitch; Shelton; Rich; Kellogg.

Œ. dentata. Watson, King's Rep., 5. 111.

58. ŒNOTHERA TENELLA. Cav., Icon., 4. t. **396, f. 2.** Ruiz & Pav., Pl. Peruv., 3. t. **316.** Persoon, Ench., 1. 408. Poir., Suppl., 4. 141. Spreng., Syst., 2. 228. Sweet, Brit. Fl. Gard., t. **167.** Seringe, DC. Prodr., 3. 48. Don's Mill., 2. 687. Torr. & Gray, Flora, 1. 504, excl. var. Dietr., Syn., 2. 1287. — No. 533 Thurber, mostly; 108 Bridges; 508, 519, 638 Brewer; 106 Torrey, mostly; 10 Blake; 193 Hall, in part; Bigelow; Parry; Bolander.

Godetia Cavanillesii. Spach, Monog., 71. Gay, Fl. Chil., 2. 338.

Œ. viminea, Var. *parviflora.* Hook. & Arn., Bot. Beech., 342. Torrey, Pac. R. R. Rep., 4. 86.

Œ. viminea. Torrey, Pac. R. R. Rep., 4. 86, in part.

Œ. purpurea. Gray, Proc. Amer. Acad., 8. 384, in part.

67. ŒNOTHERA TORREYI. — No. 109 Torrey; 189 Hall.

Œ. densiflora, Var. *tenella.* Gray, Proc. Amer. Acad., 8. 384.

9. ŒNOTHERA TRICHOCALYX. Nutt.; Torr. & Gray, Flora, 1. 494. Walpers, Repert., 2. 80. Torrey, Fremont's Rep., 89. Hook., Pl. Geyer in Lond. Journ. Bot., 6. 222. Gray, Pl. Wright., 2. 56. Newberry, Pac. R. R. Rep., 6. 74. — No. 160 Stretch; 101 Torrey; 1217, 1590 Brewer; 293 Anderson; 409 Watson; Nuttall; Fremont; Newberry; Schott; Cooper; Palmer.

Œ. deltoidea. Torrey, Fremont's Rep., 315; (Bot. Zeit., 5. 42.) Walpers, Annal., 1. 291. Watson, King's Rep., 5. 107.

Œ. albicaulis, Var. *trichocalyx.* Engelm., Amer. Jour. Sci., 2. 33. 335, in part.

21. ŒNOTHERA TRILOBA. Nutt., Journ. Acad. Phil., 2. 118; (Litt. Ber. zu Linnæa, 1829, 40.) Hook., Bot. Mag., t. **2566.** Seringe, DC. Prodr., 3. 49. Reich., Hort. Bot., 2. 18, t. **145.** Barton, Fl. N. Am., t. **37.** Don's Mill., 2. 689. Torr. & Gray, Flora, 1. 499; Pac. R. R. Rep., 2. 164. Dietr., Syn., 2. 1288. Gray, Pl. Lindh., 189; Pl. Wright., 1. 70 and 2. 58; Proc. Acad. Phil., 1863, 61. Torrey, Bot. Mex. Bound., 65. Bourgeau, Palliser's Rep., 256. Watson, King's Rep., 5. 107. — No. 392 Lindheimer; 1375 Wright; 365 Bigelow; 175 Hall & Harb.; 410 Watson; 137 Eaton; 177 Vasey; Nuttall; Bourgeau; Leavenworth; Pitcher; Smith; Bol. & Kell.

Œ. rhizocarpa. Spreng., Syst., 2. 230. Seringe, DC. Prodr., 3. 50. Dietr., Syn., 2. 1288.

Lavauxia Nuttalliana. Spach, Monog., 38, t. **31, f. 1.**

Œ. clandestina. Nutt., MS.

Œ. Rœmeriana. Scheele, Linnæa, 22. 154. Walpers, Annal., 2. 533.

35. ŒNOTHERA TUBICULA. Gray, Pl. Wright., 1. 71 and 2. 58. Torr. & Gray, Pac. R. R. Rep., 2. 164. Torrey, Bot. Mex. Bound., 66. Walpers, Annal., 4. 676. — No. 1077 Wright, and 197, in part; 372 Bigelow; Pope.

59. Œ. VIMINEA. Dougl.; Hook., Bot. Mag., **t. 2873.** Lindl., Bot. Reg., 15. **t. 1220.** Lehm.; Hook., Fl. Bor. Am., 1. 211. Don's Mill., 2. 688. Torr. & Gray, Flora, 1. 503. Dietr., Syn., 2. 1287. Torrey, Pac. R. R. Rep., 4. 86, in part, and 7. 11; Bot. Mex. Bound., 66. Bolander, Cat., 12. — No. 108 Bridges; 4919, 6367 Bolander; 102 Torrey; 265, 271 Kell. & Harf.; Bigelow.

Godetia viminea. Spach, Monog., 69.

? *Œ. tenella*, Var. *tenuifolia.* Lindl., Bot. Reg., 19. **t. 1587.**

Var. INTERMEDIA. Kellogg, Proc. Acad. Calif., 1. 60.

56. ŒNOTHERA WILLIAMSONI. Durand & Hilgard, Pac. R. R. Rep., 5. 7, **t. 5.** — No. 107 Bridges; 150 Rattan; Heermann.

Godetia Lindleyi, var. Dur. & Hilg., Journ. Acad. Phil., 3. 39.

23. ŒNOTHERA WRIGHTII. Gray, Pl. Wright., 2. 57; Pl. Thurb., 300. Torr. & Gray, Pac. R. R. Rep., 2. 164. Torrey, Bot. Mex. Bound., 65, in part. Walpers, Annal., 4. 676. — Nos. 1072, 1374 Wright; Smith.

Cross-References.

Anogra Douglasiana and *Nuttalliana* = Œ. albicaulis.

Baumannia Douglasiana and *Nuttalliana* = Œ. albicaulis.

Blennoderma Drummondii = Œ. Spachiana.

Boisduvalia Douglasii = Œ. densiflora.

Calylophis Berlandieri, Drummondiana, and *Nuttallii* = Œ. serrulata.

Godetia Cavanillesii = Œ. tenella.

G. decumbens = Œ. lepida.

G. Lehmanniana, Lindleyana, macrantha, rubicunda, and *vinosa* = Œ. amœna.

G. Lindleyi; Œ. Williamsoni.

G. Willdenowiana = Œ. purpurea.

Hartmannia gauroides = Œ. rosea.

Holostigma argutum = Œ. dentata.

H. Bottæ = Œ. bistorta.

Kneiffia angustifolia, floribunda, maculata, and *suffruticosa* = Œ. fruticosa.

K. chrysantha = Œ. pumila.

K. Fraseri = Œ. glauca, var.

Lavauxia Nuttalliana = Œ. triloba.

Meriolix Berlandieri = Œ serrulata, var.

Œ. alata ; Œ. Missouriensis ; Jussiæa sp. ?

Œ. albicaulis ; Œ. pinnatifida; trichocalyx.

Œ. ambigua = Œ. fruticosa, var.

Œ. arcuata = Œ. amœna.

Œ. Arnottii = Œ. lepida, var.

Œ. asperifolia = Œ. micrantha.

Œ. bifrons = Œ. heterophylla.

Œ. bistorta ; Œ. micrantha.

Œ. Bradburiensis = Œ. pinnatifida.

Œ. Californica = Œ. Bottæ.

Œ. Canadensis = Œ. fruticosa, var.

Œ. capillifolia = Œ. serrulata, var.

Œ. cheiranthifolia ; Œ. bistorta ; Œ. micrantha.

Œ. chrysantha = Œ. pumila.

Œ. clandestina = Œ. triloba.

Œ. clavæformis ; Œ. brevipes ; Œ. scapoidea.

Œ. contorta ; Œ. cheiranthifolia ; Œ. strigulosa.

Œ. coronopifolia ; Œ. pinnatifida.

Œ. cruciata = Œ. biennis, var.

Œ. cruciformis = Œ. scapoidea, var.

Œ. Darlingtonii = Œ. rhombipetala.

Œ. decumbens = Œ. lepida, var.

Œ. deltoidea = Œ. trichocalyx.

Œ. densiflora ; Œ. lepida; Œ. Torreyi.

Œ. dentata ; Œ. micrantha; Œ. strigulosa.

Œ. Drummondii ; Œ. Spachiana; Œ. speciosa.

Œ. *eximia* = Œ. cæspitosa.
Œ. *Fendleri* = Œ. Greggii, var.
Œ. *Fraseri* = Œ. glauca, var.
Œ. *fruticosa;* Œ. glauca; Œ. serrulata.
Œ. *gauroides* = Œ. biennis.
Œ. *graciliflora;* Œ. bistorta.
Œ. *gracilis* = Œ. pumila.
Œ. *grandiflora;* Œ. biennis, var.
Œ. *guttulata* = Œ. canescens.
Œ. *Hartwegi;* Œ. Greggii.
Œ. *heterophylla;* Œ. bistorta.
Œ. *hirta* = Œ. micrantha.
Œ. *Hookeri* = Œ. biennis, var.
Œ. *humilis* = Œ. purpurea.
Œ. *hybrida* = Œ. fruticosa.
Œ. *imbricata* = Œ. densiflora.
Œ. *incana* = Œ. fruticosa, var.
Œ. *insignis* = Œ. Greggii, var.
Œ. *laciniata* = Œ. sinuata.
Œ. *Lamarckiana* = Œ. biennis, var.
Œ. *Lampasana* = Œ. Greggii.
Œ. *lavandulæfolia* = Œ. Greggii, var.
Œ. *Leona* = Œ. heterophylla.
Œ. *leptophylla* = Œ. albicaulis, var.
Œ. *leucocarpa* = Œ. serrulata, var.
Œ. *Lindleyi* = Œ. amœna.
Œ. *linearis* = Œ. fruticosa, var.
Œ. *lithospermoides* = Œ. Boothii.
Œ. *longiflora* = Œ. sinuata, var.
Œ. *macrantha* = Œ. amœna.
Œ. *marginata;* Œ. brachycarpa; Œ. cæspitosa.
Œ. *maritima* = Œ. cheiranthifolia.
Œ. *media* = Œ. fruticosa, var.
Œ. *Mexicana* = Œ. sinuata, var.
Œ. *minima* = Œ. sinuata, var.
Œ. *mollissima* = Œ. fruticosa.
Œ. *montana* = Œ. cæspitosa.
Œ. *muricata* = Œ. biennis.
Œ. *Nevadensis* = Œ. gauræflora.
Œ. *Nuttallii;* Œ. albicaulis; Œ. breviflora.
Œ. *Oakesiana* = Œ. biennis, var.
Œ. *obtusifolia* = Œ. speciosa.
Œ. *odorata* = Œ. biennis, var.
Œ. *pallida* = Œ. albicaulis.
Œ. *paludosa* = Jussiæa, sp. ?

Œ. *parviflora* = Œ. biennis, var.
Œ. *parvula* = Œ. strigulosa.
Œ. *pilosella* = Œ. fruticosa, var.
Œ. *pinnatifida;* Œ. albicaulis; Œ. coronopifolia.
Œ. *prostrata* = Œ. sinuata.
Œ. *pubescens* = Œ. biennis, var.
Œ. *purpurea;* Œ. albescens; Œ. lepida; Œ. quadrivulnera; Œ. rosea; Œ. tenella.
Œ. *Purshiana* = Œ. pinnatifida.
Œ. *pusilla* = Œ. pumila.
Œ. *pygmæa* = Œ. Boothii.
Œ. *rhizocarpa* = Œ. triloba.
Œ. *rhombipetala;* Œ. heterophylla.
Œ. *riparia;* Œ. fruticosa; Œ. pumila.
Œ. *Roemeriana* = Œ. triloba.
Œ. *roseo-alba* = Œ. amœna.
Œ. *rubicunda;* Œ. amœna; Œ. Bottæ; Œ. epilobioides; Œ. hispidula.
Œ. *rubra* = Œ. rosea.
Œ. *salicifolia* = Œ. densiflora.
Œ. *scapigera* = Œ. cæspitosa.
Œ. *scapoidea* = Œ. alyssoides, var.
Œ. *serotina* = Œ. fruticosa, var.
Œ. *sinuata;* Œ. Drummondii; Œ. humifusa.
Œ. *Spachii* = Œ. speciosa.
Œ. *spinulosa* = Œ. serrulata, var.
Œ. *spiralis* = Œ. cheiranthifolia.
Œ. *strigulosa;* Œ. dentata; Œ. micrantha.
Œ. *suaveolens* = Œ. biennis, var.
Œ. *tenella;* Œ. biloba; Œ. Bottæ; Œ. epilobioides; Œ. quadrivulnera; Œ. viminea.
Œ. *tetragona* = Œ. fruticosa.
Œ. *triloba;* Œ. heterantha.
Œ. *uncinata* = Œ. Spachiana.
Œ. *viminea;* Œ. epilobioides; Œ. lepida; Œ. quadrivulnera; Œ. tenella.
Œ. *vinosa;* Œ. amœna; Œ. epilobioides.
Œ. *viridescens* = Œ. cheiranthifolia.
Œ. *viscosa* = Œ. sinuata.
Œ. *Whitneyi* = Œ. grandiflora.

Œ. Wrightii; Œ. Fremontii.

Onagra chrysantha, muricata, and *vulgaris* = Œ. biennis.

O. Linkiana = Œ. fruticosa, var.

Pachylophis Nuttallii = Œ. cæspitosa.

Sphærostigma contortum and *parvulum* = Œ. strigulosa.

S. hirta = Œ. micrantha.

S. spirale and *viridescens* = Œ. cheiranthifolia.

Xylopleurum, species = Œ. speciosa.

Characters of New Ferns from Mexico. By Daniel C. Eaton.

Polypodium Ghiesbreghtii. Caudice repente, penna anserina vix minore, paleis longissimis angustis mollibus pallide fulvis densissime onusto; stipite gracili levi 3 – 6 pollicari; fronde subdeltoideo-oblonga chartacea glauca tandem fulva spithamea ad pedalem, profunde pinnato-lobata, segmentis oblongis obtusis vel acutiusculis, terminati sat magno integro, lateralibus 5 – 9 paribus basi sursum currente confluentibus, 2 – 3 poll. longis, ½ – ¾ poll. latis; venulis Goniophlebii, areolis costalibus soriferis, marginalibus parvis 1 – 2 seriatis, soris majusculis mediis inter costam et marginem; sporis reniformibus.

A very handsome fern somewhat related to *P. loriceum*, but abundantly distinct from all the species to which I have been able to compare it. Lowest segments nearly as large as any of the middle ones, very slightly deflexed, subcordate on the lower side, the upper side being extended as a broad wing along the rachis, in some specimens fairly overlapping the subcordate basis of the next pair. In the middle of the frond the segments are separated by a broad, rounded sinus. The wing left on the costa is about half an inch wide, and bears an occasional fruit-dot. The fronds are at first of a pale glaucous green, but eventually, perhaps in drying, turn to a bright brown. The veins, seen by transmitted light, are blackish where they leave the costula, but become less visible toward the edge of the segments. When the slender tips of the scales of the caudex are broken off they leave ragged brownish imbricated scales, and when these are removed a pale-bluish surface is discovered. The stem or petiole is very slender, perfectly smooth, and with the rachis is of a brownish straw-color. I take great pleasure in naming this fine Polypodium after its discoverer, Dr. A. Ghiesbreght, who found it growing on oaks in the cooler region of Chiapas. It is No. 273 of his distribution.

Polypodium stenoloma. Glabrum; stipite fusco subspithameo, fere ad basin angustissime alato; fronde membranacea, glabra, circumscriptione ovata, 10 – 13 poll. longa, latitudine $\frac{2}{3}$ longitudinis, pinnatifida; segmentis 4 – 6 paribus præter terminale consimile, lanceolatis, 3 – 4 poll. longis, $\frac{3}{4}$ poll. latis, acuminatis, subintegerrimis, basi paullo angustatis, dein in alam racheos angustam utrinque dilatatis; venulis more Goniophlebii reticulatis, areolis paracostalibus magnis, soriferis, ceteris minimis vel nullis; soris oblongis, obliquis, costulæ subapproximatis. — Chiapas, Mexico, Dr. Ghiesbreght, No. 386.

This fern is closely related to the form of *Polypodium sororium* which has reticulated veins, but differs considerably from that species in having much fewer pinnæ or segments, and the terminal one nearly or quite as large as any of the others. The wing which borders the rachis is continued downwards in a narrow border each side of the stipe almost to its base. The fruit-dots are considerably elongated, as in *P. sororium* and *P. trilobum.*

ASPLENIUM NIGRICANS. Caudice brevi repente, paleis angustis nigrescentibus onusto; stipitibus crebris, rigidis, teretibus, nudis, atrosangineis, lucidis, 4 – 6 uncialibus, diametro lineam fere æquantibus; fronde opaca, nigro-fuscescente, subcoriacea, fere pedali, pinnata; pinnis utrinque 12 – 20 præter terminalem angustam acuminatam, pollicem longis, 3 – 5 lineas latis infimis triangulari-ovatis costula centrali; ceteris cultriformibus, obtusis, sursum leviter curvatis, basi superiori rachi parallelis, inferiori linea subrecta excisis, crenato-denticulatis; soris majusculis, infra costulam 1 – 3, supra eam uno vel sæpius nullo. — Chiapas, Dr. Ghiesbreght, No. 377.

The highly polished and nearly black stipes and rachis, together with the shape of the pinnæ and the small number of rather large sori, nearly all on the lower side of the pinnæ, indicate a place for this Fern not far from *A. monanthemum*, but in the size and comparative fewness of the pinnæ the resemblance is rather to *A. lætum.* The whole frond is so dark as to be almost black, and is utterly devoid of lustre. The rachis, though terete and rigid, has an exceedingly narrow brownish line on each side connecting the points where the pinnæ are inserted. — *A. nigricans* of Kunze being now by general consent referred to *A. furcatum*, this name becomes available for the present use.

Characters of New Genera and Species of Plants. By ASA GRAY.

BREWERINA Nov. Gen. *Silenearum.*

Præter stigmata terminalia capitellata et semina ovalia *Arenariæ* persimilis cum inflorescentia *Holostei.* — Sepala 5, ovata, margine scariosa. Petala 5, spathulata, cum staminibus 10 longius exsertæ, marcescentia. Discus perigynus staminifer brevissimus. Ovarium uniloculare, 6 – 8-ovulatum: styli 3, capillares, stigmatibus parvis capitellatis terminati! Ovula campylotropa, in placenta basilari brevi sessilia. Capsula ovato-globosa, crustacea in valvulas, 3 mox bifidas dehiscens. Semina abortu 2 – 4, ratione capsulæ magna, lato-ovalia, a latere compressa, hilo marginali, micropyle rostellata; testa lævi laxa molli, nucleo conduplicato. — Herba basi ramosissima suffruticosa; foliis acerosis; ramis floridis gracilibus simplicissimis cyma densa umbelliformi terminatis; bracteis involucrantibus brevibus scariosis.

BREWERINA SUFFRUTESCENS. — Sierra Nevada above Cisco, and between Truckee and Donner Lake, California, coll. Bolander and Kellogg. — Glabrous, the lower part of the stem and leaves minutely glandular. Stems much branched and decidedly woody at base, the plant forming broad matted tufts, a span or more high, leafy only at the ends of these branches, from which rise simple flowering stems of the season, a foot or less in height, slender, bearing a few pairs of leaves separated by long internodes, of which the upper one terminated by the inflorescence is 3 or 4 inches long. Leaves crowded on the persistent branches, rigid, acerose, about an inch long, a quarter of a line wide, mucronate; on flowering stems becoming shorter and with scarious connate bases. Stipules none. Flowers about half the size of those of *Holosteum umbellatum*, numerous and crowded in a solitary umbelliform cluster, which is involucrate by a few short ovate-lanceolate scarious bracts: central and oldest pedicels very short; the others 2 to 5 lines long. Sepals ovate, obtuse, herbaceous with scarious margins. Petals white, spatulate, between 2 and 3 lines long, about twice the length of the calyx. Filaments filiform, equalling the petals. Ovary globose. Capsule slightly exceeding the calyx. The seeds examined not perfectly mature, over a line in length, laterally compressed, erect, completely sessile on the very short columnar placenta; the testa soft, membranaceous, apparently somewhat fleshy and loose, perhaps margined, the micropyle extended beyond the marginal basilar hilum as if into a broad rostellum. Embryo not fully developed in the specimens. — The terminal stigma (which, so far as I know, is wholly anomalous in *Caryophyllaceæ*), the *Holosteum*-like inflorescence, the few seeds, which are neither those of *Holosteum* nor of *Arenaria*, and the suffrutescent growth, combine to justify the establishment of a new genus for this plant. As it belongs to the Flora of California, which he has for several years been engaged upon, and for which he has personally collected most important and ample materials, I propose to dedicate the genus to Professor William H. Brewer, of the California Geological Survey and of Yale College. That he may not be deprived of this well-earned honor on account of the old genus *Breweria*, I have written the name *Brewerina.*

AQUILEGIA CHRYSANTHA. *A. cæruleæ*, Torr. affinis, elatior (2-4-pedalis), floribunda; floribus saturate flavis; sepalis lanceolato-oblongis limbo petalorum paullo longioribus haud latioribus. — *A. leptocera* var. *flava* Gray, Pl. Wright. 2, p. 9; Bot. Mex. Bound. p. 30. — Eastern New Mexico (Organ Mountains not far from El Paso, Thurber, Wright; and further north, Parry) to Arizona (Mabibi, Parry, etc.). Also in South Utah? A. L. Siler (fide Meehan). Now in cultivation from seeds collected by Dr. Parry, and distributed from the Botanic Garden of Harvard University. See American Agriculturist for September, 1873, for an account of the plant, with woodcut, etc. Upon first acquaintance with this plant in dried specimens, I regarded it as a variety of the blue, long-spurred *Aquilegia* of the Rocky Mountains, some forms of which are almost or entirely white-flowered. In view of the diversity of color, and this more remarkable deviation to yellow, I was the more disposed to follow Sir William Hooker in preferring Nuttall's appropriate name of *A. leptocera*, trusting that the *A. leptoceras* of Fischer might not be a good species. But now that we have this golden Columbine in cultivation for the second season, and can review its characters, we must conclude that it may claim a distinct specific name, although the technical characters may seem to be slender. Its geographical range is different; it occupies a more southern range, and is found at less elevation than *A. cærulea.* Here at Cambridge, at least, it is more hardy, probably because it bears our summers better than its alpine relative; and it endures our winter perfectly. It is much taller, rising to the height of four feet in the rich and moist soil which it prefers; it comes into flower nearly a month later, branches freely into a panicle, and continues in bloom through the whole summer. The color of the blossom is a clear yellow, the petals of a rather deeper hue than the sepals. The sepals and the limb of the petals are not so ample as in *A. cærulea*, the former hardly exceeding an inch in length and five lines in width; they barely equal the latter in breadth, and do not much exceed them in length. The long spurs are similar, very slender, and over two inches in length. If the flowers individually are not so showy as those of *A. cærulea*, they make it up in their number and longer continuance, and are remarkable for their color.

WISLIZENIA PALMERI. Foliis superioribus (an omnibus?) simplicibus linearibus petiolo pluries longioribus; floribus fructuque præsertim majoribus; valvis maturis oblongis nervosis circa extremitatem truncatam echinatis. — On the Lower Colorado (California and Arizona), Dr. Edward Palmer, 1869. This was overlooked in the naming of Dr. Palmer's valuable collections, but is an abundantly distinct species of this peculiar genus. The leaves, so far as seen, are simple, but those at the base of the stem are unknown; it may well be that they are trifoliolate, inasmuch as several of its relations are in the habit of bearing compound leaves below and simple ones toward the inflorescence. In this species they are commonly an inch and a half long and only two lines broad. The valves or lobes of the fruit are fully two lines long (twice the size of those of *W. refracta*) somewhat cylindraceous, many-nerved, very little reticulated, the truncate extremity encircled by a row of five or six stout spinous tubercles.

FRANKENIA JAMESII (Torr. in herb.). Fruticosa, ramosissima, pedalis, scabro-puberula; ramis fastigiatis; foliis linearibus marginibus arcte revolutis quasi-acerosis sæpius punctatis; petalis 5, lamina cuneata erosa ungui subæquilonga, appendice parva ad apicem integrum fere adnata; staminibus 6; stigmatibus terminalibus; ovulis 3 oblongolinearibus ex apice funiculi sub-basilaris prælongi pendulis. — Eastern base of the Rocky Mountains, on rocks and bluffs, Colorado Territory, James in Long's Expedition, Fremont; near Pueblo, Brandegee, J. H. Redfield, E. L. Greene. Western borders of Texas, C. Wright, no. 626. — Wright's specimen is out of flower. It is named as above by Dr. Torrey in my herbarium, on comparison with a fragment collected half a century ago by Dr. James, which he had recently determined, but had not published. It is now characterized from excellent specimens, in full blossom, collected on bluffs of the Arkansas, near Pueblo, by my excellent correspondent, Rev. E. L. Greene. The species is not only much more woody than the Californian *F. grandifolia* (which comes east into Nevada), but is peculiar in having the ovules reduced to three, one for each placenta, and resupinate on very long funiculi, which are inserted close to the base of the cell. The leaves are only 2 or 3 lines long, and much fascicled in the axils. Limb of the (white) petals 2½ to 3 lines long.

CALANDRINIA. A little Portulacaceous plant of the Rocky Mountains was several years ago inadvertently, not to say carelessly, referred by me to the wrong genus, namely, *Talinum pygmæum.* This has since been more or less confused with a nearly related species of the Californian sierras. Both belong to *Calandrinia,* having persistent calyx and estrophiolate seeds, and are of the type of *C. acaulis* and some other South American species. Characters are appended.

CALANDRINIA PYGMÆA. Acaulescens, glaber; caudice crasso (fusiformi vel napiformi); foliis rosulatis linearibus basi attenuatis scapis (plurimis 1-2-pollicaribus) medio bibracteatis 1-3-floris longioribus; sepalis suborbiculatis quasi-truncatis dentibus glandulosis instructis; petalis 6-8 roseis inæqualibus; staminibus sæpius totidem; stigmatibus 3-5; stylo brevi vel subnullo; ovulis 15-20; seminibus lævibus nitidis (vix semilineam latis). — *Talinum pygmæum,* Gray in Engelm., Rep. Exped. Bryan., Sill. Jour. 33, p. 407, Proc. Amer. Acad. 7, p. 332; S. Watson, Bot. King, p. 42, pro parte. — Alpine region, Rocky Mountains of Colorado and Wyoming to the Sierra Nevada in California, and Cascade Mountains, Washington Territory.

CALANDRINIA NEVADENSIS. Major; scapis 2-4-pollicaribus folia sæpius adæquantibus, fructiferis apice incrassatis; sepalis orbiculari-ovatis nunc apiculatis margine integerrimis vel obsolete denticulatis; petalis 6-9 albis; staminibus fere totidem; ovulis 30-40; seminibus ($\frac{1}{16}$ unc. diam.) plerumque numerosis: cæt. præcedentis. — *Talinum pygmæum,* S. Watson, l. c. pro parte. — Subalpine region of Wahsatch and East Humboldt Mountains, S. Watson, and Sierra Nevada, California, at Summit and Cisco, Kellogg and Bolander. — Flowers about twice the size of those of *C. pygmæa,* the calyx 3 or 4, and in fruit 5, lines long.

PACHYSTIMA CANBYI. Surculoso-repens; foliis oblongo-linearibus parce denticulatis; pedicellis filiformibus elongatis; petalis oblongo-ovatis; stylo brevissimo. — Giles County, Virginia, on a bluff at the

"New River White Sulphur Springs," William M. Canby. — It is full time that this interesting accession to our Eastern United States flora should be published. While the original *P. Myrsinites* * occurs plentifully in most wooded districts from the Rocky Mountains to the Pacific in Northern California and Washington Territory, this is known at only one station in the Alleghany Mountains, and makes an addition to the list of those few genera (such as *Boykinia* and *Calycanthus*) which are divided between Eastern and Western North America. Mr. Canby discovered the Alleghanian species in 1868, and obtained flowering specimens upon a second visit to the station in the spring of 1869. It was submitted both to Dr. Torrey and to Dr. Curtis. The former determined the genus and indicated the specific characters; the latter proposed that it should bear the discoverer's name. Both these eminent botanists having passed away without taking any steps in the matter, it is left for me to carry their intentions into effect, and to connect with this well-marked species the name of its sole discoverer, one of the most active and excellent of our botanists of this generation. The following note respecting the station, which Mr. Canby has furnished, will be useful to botanists who may, it is hoped, make this most rare new species commonly known, and even bring it into cultivation.†

LINUM ADENOPHYLLUM. *Hesperolinon*, annum, fere glaberrimum; caule tenui effuse paniculato; pedicellis filiformibus flore 2–3-plo lon-

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* PACHYSTIMA MYRSINITES Raf. Erecta, dumosa, 1–2-pedalis; foliis ovalibus ovato-lanceolatis vel fere oblanceolatis magis serratis; pedunculis (pauci-vel plurifloris) pedicellisque brevibus; petalis late ovatis; stylo subulato. — Not being able to make out the etymology of the generic name, I am in doubt as to its gender. It may be neuter instead of feminine, as I have assumed it to be.

† I first saw this plant in August, 1858, on the top and near the edge of a jagged and very picturesque bluff of limestone rock, of about four hundred feet in perpendicular height, which causes a very abrupt bend in the "New River," flowing at its base. It is in Giles County, Virginia, at a place of summer resort called "The New River White Sulphur Springs." The top of the bluff and the hill beyond are covered with a forest of deciduous trees and cedars. Below in the clefts and in the shelves of the rock are found plentifully *Sedum telephioides, S. Nevii*, Gray, *Arenaria patula*, Michx., *Phacelia parviflora*, Pursh, and other interesting plants. At the time mentioned, *Pachystima* was neither in flower nor fruit. But again visiting the locality about the middle of May, 1869, I had the good fortune to find it in flower and a single specimen with an immature capsule, which at that stage of growth appears very much like that of *P. Myrsinites* Raf. W. M. C.

gioribus demum patentissimis; foliis alternis angustissime linearibus margine glandulis brevissime stipitatis seu dentiformibus creberrime ciliolatis; glandulis stipularibus parvis; sepalis oblongo-lanceolatis acutis margine rariter vixve glanduloso-denticulatis; petalis ut videtur flavis calyce subduplo longioribus, ungue lato ima basi utrinque unidentato intus appendice squamiformi parvo aucto; sinubus inter stamina nudis; antheris lineari-oblongis; stylis 3 gracilibus; stigmatibus minimis. — California, near Clear Lake, May, 1872, H. N. Bolander. — This is another trigynous *Linum*, related to *L. spergulinum* and *L. micranthum*, with flowers not larger than those of the latter; distinguished by the thickly set glandular ciliation of the leaves. A minute pubescence appears on the lower part of most of the internodes.

DALEA HALLII. Herbacea; caulibus gracilibus e radice perenni fusiformi decumbentibus laxe ramosis pube adpressa minuta cinereis; foliis pinnatim trifoliolatis glabratis; foliolis linearibus acutis rariter glandulosis petiolo haud complanato 2 – 3-plo longioribus; spica subsessili oblonga densiflora; bracteis ovato-lanceolatis sericeo-pubescentibus calycem haud superantibus; calyce villoso, dentibus e basi lata subulato-setaceis tubo subglandulifero longioribus; corolla flava, alis vexillum flabelliforme multo superantibus. — On limestone, Dallas, in Northeastern Texas, Elihu Hall, 1873, no. 132. — This is nearly related to *D. trifoliolata* Moricand, of Mexico, which is probably *D. prostrata* Ortega; but much more slender, branching, with narrower leaflets and petiole, smaller flowers, shorter bracts, and a minute close pubescence except on the bracts and calyxes.

HOSACKIA TORREYI. Molliter nunc sericeo-pubescens, inferne glabella; stipulis subulato-lanceolatis scariosis; foliolis 7 – 10 obovatis oblongo-ovatis vel fol. superiorum lanceolato-oblongis; pedunculis folium superantibus; umbella 3 –7-flora bractea unifoliolata stipata; calycis villosi dentibus subulatis tubo æquilongis; vexillo saturate luteo, alis carinaque albis. Sierra Nevada, California, along the shady banks of streams, at the elevation of 4,000 feet and upwards; common from Clark's to the Yosemite Valley, where it has been collected by Bridges, Torrey, Bolander, and by myself.— Var. NEVADENSIS: pube tenuiori; bractea 3-foliolata; floribus minoribus. Near Donner Lake, Torrey. On account of the very neat particolored flowers, this species would be attractive in cultivation. I had at first (overlooking the stipules) taken it for a small-flowered variety of *H. grandiflora*, and afterwards supposed it might belong to the little-known *H. oblongifolia* Benth.

But a comparison which has been obligingly made at Kew with the unique original specimen belonging to the Herbarium of Trinity College, Dublin, shows that to be a different species, of more southern habitat, to which a specimen collected by Dr. Horn in Owens's Valley or at Fort Tejon seems to belong. As the species now at length discriminated and characterized was probably (after Mr. Bridges) first collected by the chief and Nestor of our science, of whom we have just been bereaved, it may most appropriately bear his venerated name.*

ASTRAGALUS LEMMONI. *Oroboidei:* striguloso-puberulus; caulibus e radice perenni adscendentibus diffusis gracillimis 1 – 2-pedalibus ramosis; foliolis plerisque 5-jugis lineari-oblongis (lin. 4 longis); stipulis discretis triangulari-lanceolatis petiolo brevi sæpius æquilongis; pedunculis folium adæquantibus; racemo spiciformi oblongo densifloro; floribus patentissimus parvis (lin. 3 longis); calycis dentibus attenuato-subulatis tubo campanulato æquilongis; vexillo emarginato carina duplo longiore; stylo brevi; stigmate capitato; ovario semi-bilocellato 8-ovulato; legumine subcoriaceo parvo (lin. 2½ longo) ovato-oblongo haud stipitato puberulo bilocellato, sutura dorsali intrusa, ventrali acuta, sectione transversa obcordata. — Sierra Valley, Sierra County, California, J. G. Lemmon, communicated by Dr. Bolander. — I am uncertain whether this was collected by Mr. Lemmon, or by Dr. Bolander himself; but it belongs to a collection from an interesting district of the Sierra Nevada, a part of which was gathered by Mr. Lemmon, who first botanized in this valley; wherefore the present very distinct species may well bear his name. The stigma is unusually large for an *Astragalus*, and distinctly capitate. The raceme does not elongate in fruiting. The corolla is seemingly white, with a tinge of purple, and perhaps of yellow.

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* The *Euhosackiæ veræ*, with obviously pinnate leaves and developed stipules, may readily be distinguished as follows: —

Stipules ample and foliaceous: the umbel many-flowered: calyx-teeth short.
Very silky-villous: leaf-like bract near the umbel . . H. INCANA.
Villous-pubescent and viscid: the bract or leaf remote . H. STIPULARIS.
Stipules scarious.
Bract much below the many-flowered umbel: calyx-teeth very short . . . . H. CRASSIFOLIA.
Bract (when present) borne at the summit of the
One – four-flowered slender peduncle.
Leaflets 5 – 9, obovate or linear: bract 3-foliolate . H. ANGUSTIFOLIA.
Leaflets 5 – 7, linear-lanceolate, acute at both ends: bract 1-foliolate or none . . . . . . H. LATHYROIDES.
Several- (5 – 10-) or only from the lowest axils 2 – 4-flowered peduncle.
Minutely appressed-pubescent, except below: bract 1-foliolate: corolla yellow and purplish . . H. OBLONGIFOLIA.
Soft or silky-pubescent: bract 1 – 3-foliolate: vexillum yellow; wings and keel white . . . . H. TORREYI.
Glabrous throughout or nearly so: claws of the petals elongated.
Bract none, or a scarious rudiment: vexillum and keel yellow; wings white . . . . H. BICOLOR.
Bract 3-foliolate; vexillum yellow; keel and wings rose-purple . . . . H. GRACILIS.

IVESIA MUIRII. Nana (tantum pollicaris e caudice crasso); foliis confertis scapum 1–2-bracteatum capitato-pauciflorum subæquantibus myosuroideis, nempe foliolis 3–5-sectis segmentisque minimis subrotundis sericeo-villosissimis rhachin arctissime imbricantibus; petalis flavidis parvis demum lanceolatis calyce brevioribus; staminibus 5 brevibus; receptaculo circa carpella 2 longe villoso. — The foliage considerably resembles that of *I. santolinoides* on a dwarfed scale, and is equally silky. In all other respects it is of the same type as *I. pygmæa* and *I. lycopodioides*, but it has much smaller petals, which are said by the collector to be "yellow." They are only a line long; and the calyx, when spread out, 3 lines in diameter. Filaments half the length of the calyx-lobes. I have with pleasure named this little plant after my friend and valued correspondent, Mr. John Muir, an ardent explorer of the Sierras, especially of their glacial phenomena. He discovered it in 1872 on Mount Hoffmann, at the altitude of 9,500 feet. The specimen is just coming into blossom, and the scape is likely to be sometimes taller.

LONICERA. Some notes upon the Western American species are here appended.

§ CAPRIFOLIUM. The Pacific North American species are apparently only two, namely: —

L. CILIOSA Poir. (*Caprifolium* Pursh), of which *L. occidentalis* (*Caprifolium* Lindl. Bot. Reg. t. 1457) is a synonym. Oregon.

L. HISPIDULA Dougl. *Caprifolium hispidulum* Lindl. Bot. Reg. t. 1761. This reaches from the Columbia River through California, in a multitude of forms, to many of which the specific name is wholly inappropriate. The original, or

Var. DOUGLASII, includes also *L. microphylla*, Hook. Fl. Bor.-Am. That passes along the drier coast of California into

Var. SUBSPICATA, *L. subspicata* Hook. & Arn.; Torr. Bot. Mex. Bound. p. 71, t. 29; — a bushy and small-leaved form, with glandular pubescence on the inflorescence, calyx, and corolla.

Var. INTERRUPTA, *L. interrupta* Benth. Pl. Harwegianæ, is like it, but glabrous and mostly glaucous; the filaments perhaps less hairy at base.

Var. VACILLANS, *L. Californica* Torr. & Gray, includes various mostly stronger-growing, larger-leaved, and more climbing forms, with or without the spreading scattered hairs, and the inflorescence, calyx, etc., either conspicuously or obscurely glandular, — passing on one hand into the last, on the other into the first variety or form.

§ XYLOSTEUM DC. (*Xylosteum* Adanson.) The limb or teeth of the calyx cannot properly be said to be "deciduous" in any North American species except *L. involucrata.*

L. INVOLUCRATA, Banks, was published one year earlier than the volume which contains the character of *L. Ledebourii* of Eschscholtz, although the latter's paper was communicated to the St. Petersburg Academy two years before. The ample involucre consists of the common pair of large foliaceous bracts, and within, decussating with these, a pair of rounded and more scarious bractlets to each flower, generally connate two and two by their contiguous edges.

L. CÆRULEA L. Peduncle very short; bracts subulate and longer than the completely combined ovaries; bractlets none; corolla obscurely bilabiate, yellowish-white. In the Sierra Nevada of California and northward in Oregon occurs the form with villous corolla, as in Eastern Asia. In New England and north of it the corolla is nearly glabrous, and also shorter.

L. CILIATA Muhl. Peduncles slender; bracts subulate and minute; bractlets obsolete; corolla yellowish-white, obscurely bilabiate, the lobes short; ovaries distinct. Confined to the northern line of the Atlantic States and Canada; excepting Lyall's specimens from Pend Oreille River, British Columbia, which appear to be of this species, although the branches are erect and the leaves obtuse.

L. UTAHENSIS Watson, Bot. King, p. 133, is still uncertain for want of good flowers. By the foliage, bracts, etc., it might be this northwestern form of the preceding; but the single withered flower found is only half as large, apparently purplish, and shortly but distinctly bilabiate. It has much of the aspect, but not the bracts and ovaries, of *L. Chamissoi.*

L. CONJUGIALIS Kellogg, Proc. Acad. Calif. 2, p. 67, fig. 15. Kellogg's plant, from Washoe, Nevada, must needs be the same as my *L. Breweri*, Proc. Amer. Acad. 6, p. 537, and 7, p. 349, which I have since collected in Mariposa County, but never with peduncles longer than the leaves. It is at once known from all American species by the dull dark purple and deeply bilabiate corolla, and nearly obsolete bracts and bractlets. With its near relative in Eastern Asia, *L. Maximowiczii*, I have already compared it.

L. OBLONGIFOLIA Hook., confined to the Northern Atlantic States and Canada, also has a strongly bilabiate (yellowish-white) corolla, and long peduncles. The ovaries vary, even on the same shrub, from completely united to nearly distinct.

MONOTROPA (HYPOPITYS) FIMBRIATA. Pedalis, inflorescentia excepta glabra; racemo brevi conferta puberula; bracteis sepalisque obovato-cuneatis spathulatisque fimbriatis parce pilosis; antheris majoribus: flos raro trimerus. — *Pleuricospora fimbriolata* Gray in Proc. Am. Acad. 8, p. 394 (Oregon, E. Hall no. 357), not of 7, p. 396. This plant was carelessly misnamed by me: it is totally different from my *Pleuricospora*, except in the strikingly fimbriate-lacerate bracts, which misled me. There is some approach to this fimbriation in certain Eastern States specimens of *M. Hypopitys*, to which the present species is nearly related.

GHIESBREGHTIA, Nov. Gen. *Scrophulariacearum.**

Calyx alte 5-partitus, segmentis linearibus æstivatione ut videtur valvatis. Corolla ventricosa, bilabiata; labio postico æstivatione exteriori erecto concavo breviter bilobo tubum late campanulatum adæquante, antico æquilongo trisecto patente, lobis oblongis planis. Stamina 2, fundo corollæ inserta, rudimentaria nulla: filamenta exserta, divergentia: antheræ biloculares, loculis mox divergentibus apice confluentibus. Stylus filiformis, e labio postico breviter exsertus: stigma subcapitato-bilobum. Capsula *Pentstemonis*. Semina numerosissima, oblonga, immarginata. — Frutex Mexicanus, orgyalis, ramis crebre foliatis, foliis alternis, pedunculis in axillis solitariis ebracteatis unifloris, flore magno "flavescente, odore suavo."

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* *Ghiesbreghtia* Ach. Richard is referred to *Calanthe*.

G. GRANDIFLORA. In a dry ravine near the town of Comitan, province of Chiapas, Mexico, in a temperate region, Dr. Ghiesbreght. — Young branches, foliage, etc., clothed with a fine soft pubescence. Leaves rather crowded, oval or oblong, about 2½ inches long, thickish, pinnately veined, few-toothed near the obtuse or barely acute apex, narrowed at the base into a short petiole. Peduncles solitary, an inch long, wholly bractless. Segments of the calyx nearly an inch in length, equal. Corolla nearly 3 inches long, glabrous within and mostly so without; the tube inflated from the very base; the upper lip broad, somewhat arching, 2-lobed at the summit; the divisions of the lower lip narrower, but of nearly the same length. Stamens equalling the upper lip of the corolla. Anthers at first hippocrepiform, the cells at length divaricate, dehiscent by a continuous line. Capsule of firm texture, an inch long, ovate, didymous, acute, 4-valved at the apex. Seeds minute, somewhat scobiform, smooth.

Apparently a remarkable new genus, which would naturally be referred to the *Cheloneæ*, except for the simple ebracteolate peduncles, and the slightly if at all imbricated sepals.

SCUTELLARIA PARVULA Michx., var. MOLLIS. Diffusa, majuscula undique molliter pubescens, pube subviscida; foliis sæpe ¾-pollicaribus. — Oquawka, Illinois, on the sandy banks of the Mississippi, H. N. Patterson. — So different in aspect is this plant from the ordinary *S. parvula* (which occurs in the vicinity), that I at first took it for *S. Drummondii*, and then for a distinct species; but I cannot detect sufficient characters; and these are transitions to the ordinary *S. parvula*. It produces similar moniliform strings of small tubers, each internode to the number of 8 or 10 thickening.

ERIOGONUM VILLIFLORUM. Acaule, pulvinato-cæspitosum, sericeo-villosum; foliis in caudice multicipiti subcrasso rosulato-confertissimis spathulato-lanceolatis (lin. 3 – 5 longis) albo-sericeis marginibus subrevolutis; scapo pollicari nudo; cyma capituliformi oligocephala bracteis linearibus 4 – 5 capitula breviter pedicellata paullo breviora involucrantibus stipata; involucris 6 – 8-fidis; perigonio campanulato (fundo lato) extus intusque sericeo ad medium usque 6-fido, lobis æqualibus albidis costa valida instructis; genitalibus glabris. — Kane County, Southern Utah, collected by Mr. Siler, communicated by Thomas Meehan. — A remarkable species, which, if the ovary were woolly, would be referred to the *Lachnogyna* section, but which actually seems, on the whole, to represent an acaulescent division of the *Fasciculata*.

DIRCA OCCIDENTALIS. Foliis ovalibus basi rotundatis; squamis involucri extus albido-villosis; floribus fructibusque fere sessilibus; perigonio breviter infundibuliformi tri-quadrilobo. — California, on the Oakland hills (perhaps in ravines), Dr. J. M. Bigelow (*D. palustris* Torr. Bot. Whippl. p. 77, non Linn.), Dr. A. Kellogg and W. G. W. Harford, no. 895 of distribution. — A second species of this before monotypical genus is of peculiar interest. The Californian *Dirca* was collected twenty years ago by Dr. Bigelow, "with flowers and young fruit," according to Dr. Torrey, but there are only vestiges of the former in my specimens. If they had been in good condition, Dr. Torrey would have noticed the characters of the species, which are now manifest. The white hairs of the floral bud-scales may not be constant; for in *D. palustris* they are occasionally pale; but the deep and rounded lobes of the more funnelform calyx are characteristic, being from one fourth to one third the length of the tube. Very commonly there are only three sinuses, one lobe being broader and emarginate. The stamens are uniformly eight. The original species may be thus characterized: —

DIRCA PALUSTRIS Linn. Foliis basi angustioribus; squamis involucri nigricanti-villosis; floribus pl. m. pedicellatis; perigonio tubuloso-infundibuliformi margine tantum repando. — Nova Scotia to Lake Superior and Lake of the Woods, and southward to Florida along the Alleghanies.

Notes on Compositæ and Characters of certain Genera and Species, etc. By ASA GRAY.

THE following notes and characters are partly in the way of commentary upon the recent most important revision of the order *Compositæ* by Mr. Bentham, in the second volume of Bentham and Hooker's *Genera Plantarum*, and partly the re-elaboration of certain genera, or the addition or reformation of species, chiefly such as have fallen in my way while engaged upon this portion of the Flora of California.

HOFMEISTERIA Walp. The character "pappi . . . paleis *acutis*" is indeed applicable to the later species, but not at all to Bentham's original species: the paleæ are rightly figured in Bot. Sulph. t. 14, as very truncate and lacerate at the summit.

ADENOSTYLES NARDOSMIA. The Californian species referred to this genus in Gen. Pl. p. 247 is indeed an interesting and rather anomalous plant. I had in the first instance, as is stated, referred it to this genus; but afterwards, learning that the flowers were "of the color of yellow beeswax," had thought it necessary to place it in the *Senecioneæ;* and accordingly, in Proc. Am. Acad. 7, p. 361, I published it under the name of *Cacalia Nardosmia*, in view of the striking resemblance of the leaves to those of *Nardosmia palmata*, Hook., although the characters of the modern *Cacalia* were equally repugnant to yellow flowers. The great number of flowers in the head and their size are noteworthy peculiarities of the Californian species.

CARPHEPHORUS Cass. The character "pappi setæ 2–3-seriatæ, elongatæ, inæquales, scabræ vel breviter barbellatæ," in Gen. Pl. p. 249, applies only to the Atlantic United States species (and in them, even, the pappus is hardly more copious than in some species of *Brickellia*). As to the Californian species, Bentham himself ascribed to *C. junceus* "setis circa 15 longe et molliter plumosis," and *C. atriplicifolius* is just the same in these respects; the setæ are equal, rather stout, and in a single rank. The Californian species have a different habit, opposite leaves at the lower part of the *branching* stems, and shorter (but still spreading) lobes to the corolla, which apparently is not "purple"; since Dr. Cooper notes the flowers of *C. junceus* as yellow,—probably ochroleucous. Indeed, these Californian species are more closely related to *Brickellia* than the genuine *Carphephorus* is to *Liatris*, and still more to *Kuhnia*, into which they would fall if (as in *Ageratum*, etc.,) we were to disregard the chaff of the receptacle. So they may best be left where they are, but under a distinct section, *Kuhnioides.*

BRICKELLIA Ell.: p. 247. The bristles of the pappus are never so much as "breviter plumosæ," or perhaps even "subplumosæ" (as in Pl. Wright.): these phrases doubtless came from De Candolle's "barbellato-plumosæ" in the character of *Clavigera*, which was too strong.

XANTHOCEPHALUM Willd., including *Xanthocoma* HBK., is well made to include our *Gutierrezia gymnospermoides*, Pl. Wright. But by the same rule it must also comprise *G. Wrightii* Gray, Pl. Wright. 2, p. 78 (= *Xanthocephalum Wrightii*), and yet the line to draw between the two genera will not be perfectly clear.

GUTIERREZIA Lag. is held to comprise *Amphipappus* as well as *Amphiachyris.* The close relationship of the former with the latter is undoubted; but it is better to separate the two species from *Gutierrezia*, on account of the sterile disk, with almost if not quite setose pappus.

Amphiachyris dracunculoides Torr. & Gray, and *A. Fremontii* (*Amphipappus Fremontii* Torr. & Gray) constitute the species.

PENTACHÆTA Nutt. — *P. gracilis* Benth. in Ic. Pl. t. 1101, judging from the figure and description, cannot be of this genus. The style-branches, even if "not quite so obtuse as represented in the plate," altogether want the long linear-filiform appendage surmounting the short and flat stigmatiferous portion, and, with the opposite leaves toward the base of the stem (and, I may add, the beard represented on the lobes of the disk-corolla), as Mr. Bentham remarks, connect it technically, and it seems to me really, with *Helenioideæ.* It appears to be a species of *Oxypappus.*

As to *Pentachæta* itself, I find no bilabiation or obliquity in the disk-corollas, such as Nuttall mentions. And there are two species, which may be well distinguished, namely: —

PENTACHÆTA AUREA Nutt., from San Diego and the vicinity, has the heads perhaps always many-flowered (but the size of the head and number of the flowers varying greatly), and the scales of the involucre are acute or acuminate and well imbricated, the exterior successively shorter; the rays are golden yellow, and it is not known that the pappus is ever abortive.

PENTACHÆTA EXILIS (not a happy name for the larger forms) has the scales of the involucre less scarious, oblong or oval, obtuse, but often mucronate-tipped, all nearly equal in length; the rays very light yellow; pappus as in the original species, or in some specimens (mixed with the others) some or all of the bristles short or obsolete. This equally occurs in those with rather large and many-flowered and those with few-flowered heads. Either form may be rayless and homogamous. But some specimens have barely 3 to 5 pistillate flowers, which are destitute of ligule, the tube of the corolla only remaining. These are *Aphantochæta exilis*, Gray in Bot. Whippl. (Pacif. R. R. Expl. 4), t. 11, which must be viewed as an occasional and reduced state of a full-rayed species. It is only in the small and mostly rayless forms that the corollas seem to turn purplish.

XANTHISMA DC. It appears on the whole most proper to reinstate this genus, although a transition to *Aplopappus* is afforded by the section *Prionopsis*, which seemingly is best restricted, as proposed, to *A. ciliatus.* — The following is still more worthy of generic separation, and should be ranked rather with genera having paleaceous than with those of setose pappus.

ACAMPTOPAPPUS, Nov. Gen.

Capitulum homogamum, 12 – 30-florum. Involucrum hemisphæricum; squamis imbricatis triserialibus concavis appressis coriaceo-chartaceis obtusissimis margine scarioso eroso-fimbriolato limbatis sub apice macula viridula notatis cæterum albidis, extimis orbiculatis, intimis oblongis. Receptaculum subconvexum alveolatum, alveolis fimbrillatis. Corollæ infundibuliformes, limbo 5-lobo. Antheræ *Asterinearum.* Styli rami complanati, appendice triangulari-subulata hirtella terminati. Achenia turgido-turbinata, sericeo-villosissima (sub lana leviter 5-nervia). Pappus paleaceo-setosus, nempe, ex aristis setisve numerosis, 12 – 18 validioribus (achenio corollæque æquilongis) complanatis subclavellatis, cæteris brevioribus gracilioribus. — Suffrutex ramosissimus, angustifolius, glaber, capitulis subcorymbosis, floribus luteis.

A. SPHÆROCEPHALUS. *Aplopappus* (*Acamptopappus*) *sphærocephalus* Gray, Pl. Fendl. p. 76; Torr. in Pacif. R. R. Expl. 7, p. 12, t. 6.

LESSINGIA Cham. is a well-marked but very peculiar genus, which Mr. Bentham might perhaps have placed near to *Hinterhubera,* had he been aware that only the original species has yellow flowers. The other four are indeed homochromous, but cyanic, and also homogamous. Moreover, even *L. Germanorum* is not truly heterogamous; the anthers of the marginal flowers being present, and, I believe, commonly polleniferous. The flowers, at least in *L. leptoclada,* the only one I have seen in the living state, have a peculiar Centaurea-like aspect quite unlike anything Asteroideous; yet I should still maintain that it is more nearly related to *Corethrogyne* than to any other genus known to me. This relationship is manifested in the attenuated anther-tips, as well as in the style-branches, achenia, foliage, involucre, etc. From Bentham's notes: "Species 4 Californiæ Mexicique incolæ," and "Achænia glabra v. sericea," one may suppose that there is a Mexican species, still undescribed, which has glabrous achenia. These are silky-hairy in all the *five* described species.

APLOPAPPUS. No doubt the name should have been written *Haplopappus;* but as Cassini in founding the genus dropped the aspirate, and De Candolle followed him, it seems hardly necessary to go with Endlicher and Bentham in restoring it. The genus, like its analogue *Aster,* comprises very diverse forms, too intimately and variously connected to warrant the generic separations which have been attempted.

Like *Aster*, too, it has a few annual or biennial species, so that *Xanthisma* is not supported by this subsidiary character. Bentham makes *Aplopappus* include all the groups which I have referred to it, excepting Nuttall's *Ericameria* and *Macronema*. I have endeavored to adopt his view while now revising the North American species, but I find it impossible to do so. Neither the style-appendages (which are " long and narrow " in many an admitted North American species), nor the form and nature of the involucre and number of flowers it contains, nor the form of the achenia, nor the texture of the pappus, nor the habit, taken singly or in any practicable combination, enable me to draw any clear line of separation. Nor is the line which must be drawn for the demarcation of *Bigelovia* (*Chrysothamnus*) any less arbitrary when we have two bordering genera to deal with instead of one. One of Nuttall's species of *Macronema* closely connects *Ericameria* with other sections of *Aplopappus*, and the other with *Chrysothamnus;* while, as to *Chrysopsis*, a pretty well marked genus is rendered vague by the admission of species of a different habit and no external pappus.

It should be noted that Bentham's section *Haplodiscus* is not De Candolle's *Aplopappus* sect. *Aplodiscus*, the typical species of which is referred to *Bigelovia;* while the other proves to be a *Baccharis.*

Bentham's doubt whether *Aplopappus marginatus* Griseb. Cat. Pl. Cub. belongs to the genus, or has yellow rays, is well founded. Mr. Wright's tickets preserved here, as well as the one cited by Grisebach, state that the rays are white; and the plant is doubtless an *Aster* of the *Oxytripolium* section, allied to *A. Chapmanii* and *A. flexuosus* of Nuttall, i. e. *A. tenuifolius* Linn.

Recent collections have furnished the following additions to the *Ericameria* sections: —

APLOPAPPUS (ERICAMERIA) CUNEATUS. Fruticosus, ut videtur depressus, cæspitoso-ramosissimus, glaber, mox glutinosus; ramis floridis ad apicem usque foliosis; foliis cuneatis vel spathulato-dilatatis (apice lato truncato vel emarginato) integerrimis crassis resinoso-punctatis eveniis, costa vix prominula; capitulis subcorymbosis 20–24-floris; involucri turbinati squamis pluriseriatis lanceolatis carinato-uninerviis chartaceo-coriaceis, interioribus marginibus apiceque leviter scariosis disco brevioribus, exterioribus sensim brevioribus; ligulis circa 3 discum haud superantibus; appendicibus styli angustis parti stigmatiferæ æquilongis; acheniis lineari-oblongis compressis parce hirsutis; pappo parum rigido sordido. — California, in " Bear Valley, alt. 4,500

feet, Sept.," Kellogg, Bolander, etc.; no. 402 of Kellogg and Harford's distribution. — Heads half an inch long. Scales of the involucre more numerous, narrower, and less obtuse than those of *A. ericoides*. Achenia apprently broader and more decidedly compressed than in that species; the pappus similar. Leaves from a quarter to half an inch long, thick and rigid.* — A similar or perhaps the same species was collected in Arizona by Dr. E. Palmer in 1870, but without flowers.

APLOPAPPUS (ERICAMERIA) PINIFOLIUS. Fruticosus, 2 – 4-pedalis, glabratus, vix glutinosus; ramis fastigiatis usque ad capitulum solitarium foliosissimis; foliis fere acerosis (plerisque pollicaribus) pl. m. punctatis; involucro campanulato foliis summis capitulum adæquantibus vel superantibus involucrato, squamis propriis ovato- vel oblongo-lanceolatis acuminatis coriaceis rigidis, margine tantum scarioso; ligulis circiter 20 brevibus angustis; appendicibus styli filiformibus parte stigmatifera brevioribus; ovariis linearibus fere glabris; pappo rigidiusculo albo. — Near Los Angeles, in a dry river-bed, Bolander, 1873. — The leaves most resemble those of *A. laricifolius*, but are still more narrow, or those of *Bigelovia arborescens*. Head always solitary at the summit of a very leafy branch, about four lines high. Most of them in the few specimens received are abnormal, having chaff on the receptacle, and the flowers they subtend often pistillate and ligulate, instead of hermaphrodite and tubular: others are in a normal condition.

APLOPAPPUS (ERICAMERIA) BLOOMERI, Gray. To this, and not to Nuttall's *Ericameria resinosa*, belongs the plant figured in the Botany of Wilkes's Expedition, plate 10, under the name of "*Aplopappus resinosus.*"

NARDOPHYLLUM GENISTOIDES, *Dolichogyne genistoides* Philippi in Linnæa, 28, p. 738. This striking species occurs in the collection of the United States Pacific Exploring Expedition under Wilkes, with no ticket indicating habitat. It is now evident that it must have been gathered in the Andes near Santiago, Chili. The specimens have lanceolate (rather than oblong-linear) leaves, with a cuspidate tip, and the heads are fully an inch long. Bristles of the pappus conspicuously barbellate towards the summit.

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* All the flowers of one head exhibited a singular monstrosity of the corolla, namely, five or sometimes three or four ligulate lobes outside of the ordinary lobes, and inserted on the middle of the tube, forming an accessory circle of parts, equalling in length the true corolla.

CHRYSOTHAMNUS, Nutt. This is the name adopted in the Genera Plantarum for the group containing not only the *Chrysothamnus* of Nuttall, and all the species which I have at various times generically combined with it under the name of *Linosyris* (Schlechtendal having led the way with a Mexican species), but also *Bigelovia* DC., as restricted in Torr. & Gray's Flora. All this consolidation is evidently necessary, as also the separation of these American species from *Linosyris* of the Old World, the species of which, by the occasional production of heterochromous rays, are now proved to belong to *Galatella*, i. e. to *Aster* in the largest sense. But *Chrysothamnus* is a much later name than *Bigelovia*, which, as Bentham cursorily indicates in the appendix, is to be adopted. The genus, as now received, is nearly as polymorphous or composite as *Aplopappus* itself, from which at more than one point it is quite arbitrarily separated. On the other hand, it is as arbitrarily distinguished from the *Euthamia* subgenus of *Solidago*, *B. diffusa* and *B. arborescens* sometimes developing a small ray or two. As these species have lanceolate or even broader style-appendages, achenia which are not very slender and taper to the base, and ampliate rather deeply cleft limb to the corolla, we have to rely upon the unequal bristles of the pappus and the woody habit to keep them out of *Solidago*. The typical *Bigelovia* and all the genuine *Chrysothamni* partake of the character which is so strikingly displayed in *B. pulchella*, *Bigelovii*, and *depressa*, namely, the imbrication of the scales of the involucre in five (rarely four) strict vertical ranks. The slender style-appendages of *Ericameria* also characterize the section *Chrysothamnus* and another group which lies between the two; while the original *Bigelovia* has the style as well as the habit of *Solidago*, section *Euthamia*. The cusp in the centre of the receptacle of *B. nudata* occurs (sometimes in a more chaffy form) in the original specimens of *B. Bigelovii*, also in those recently received from Mr. Greene, but not in those collected by Dr. Parry; and it is represented by some chaff-like extensions of the alveoli in *B. Bolanderi*, as also by the setiform elongated fimbrillæ in *B. diffusa*. The achenia are at least 5-nerved in almost all the species; several have intermediate, usually more slender nerves.

In the subjoined revision, the first section ends with species which are ambiguous between *Bigelovia* and *Solidago*, and the whole with the better characterized but very Solidagineous original species.

BIGELOVIA DC. excl. § 3. (*Chrysothamnus* Nutt., Benth. & Hook. Gen. Pl. 2, p. 255.)

§ 1. Diplostephioides Benth. & Hook. Involucrum pluriflorum, cylindraceum; squamis siccis latis obtusis spiraliter imbricatis: corollæ limbus 5-partitus! lobis linearibus: appendices styli lanceolatæ parte stigmatica breviores : achenia linearia. Frutices vel arbusculæ Andinæ, habitu alieno: folia lanceolata penninervia subtus tomentosa: capitula amplius corymbosa.

1. B. hypoleuca. *Aplopappus hypoleucus* Turcz. in Bull. Mosc. 1851, p. 177. *Linosyris Mandonii* Schult. Bip.

2. B. fuliginea *Baccharis fuliginea* HBK., ex Benth.

§ 2. Aplodiscus. Involucrum pluri–multiflorum campanulatum vel turbinatum, in penultimis paucifloris angustum; squamis spiraliter imbricatis, i. e. seriebus verticalibus haud conspicuis: corollæ limbus 5-lobus: appendices styli aut triangulari-ovatæ aut subulato-lanceolatæ parte stigmatica breviores: achenia breviuscula.

* *Aplopappoideæ*, foliis sæpius dentatis lobatisve ; involucri squamis apice herbaceo notatis.

3. B. veneta. *Baccharis veneta* HBK. Nov. Gen. & Sp. 4, p. 68. *Aplopappus* (*Aplodiscus*) *discoideus* DC. Prodr. 5, p. 350. *Linosyris Mexicana*, Schlecht. Hort. Hal. p. 7, t. 4. — Mexico: approaches the borders of the United States, but apparently not found within.

4. B. Menziesii. Foliis oblanceolatis spathulatisve rigidis parce argute dentatis nunc pinnatilobatis; capitulis pauciusculis glomeratis; involucri 12–20-flori squamis obtusis; acheniis fere linearibus subcompressis. — *Pyrrocoma Menziesii* Hook. & Arn. *Aplopappus* (*Aplodiscus*) *Menziesii* Torr. & Gray. *Linosyris dentata* Kellogg, Proc. Calif. Acad. 2, p. 16? — California to Arizona. Very near the foregoing, and probably passes into it. The most tangible differences are that the scales of the involucre in *B. veneta* are more or less acute, and the achenia shorter and turbinate.

5. B. coronopifolia. Ramis gracilioribus; foliis punctatis pinnato-3–7-partitis, segmentis (setaceo-mucronatis) rhachique angusto-linearibus nunc fere filiformibus; capitulis pauciusculis glomeratis; involucri 10–12-flori squamis obtusis; acheniis subturbinatis.—*Linosyris coronopifolia* Gray, Pl. Wright. 1, p. 96. — Texas, and along the

Rio Grande to Southern Arizona (E. Palmer). Dr. Palmer's plant, with rather shorter and broader lobes and rhachis to the leaves, approaches no. 114 of Hartweg's Mexican collection, which probably belongs here.

6. B. DRUMMONDII. Suffrutescens, glaber; foliis obsolete punctatis linearibus basi attenuatis crassiusculis integerrimis; capitulis laxius corymbosis; involucri 20 – 30-flori squamis obtusis coriaceis apice virido, marginibus vix scariosis; acheniis linearibus subcompressis. — *Linosyris Drummondii* Torr. & Gray, l. c. — Texas, near the coast, from Indianola to the Rio Grande.

* * *Euthamioideæ*, capitulis numerosiorbus minoribus, involucri squamis apice vel costa minus parumve viridulis vel concoloribus.

+– Folia lanceolata vel linearia: capitula conferte corymbosa lin. 4 – 5 longa.

7. B. WRIGHTII. Suffruticosa, glabra, glabrata, vel hirtello-scabra; ramis e basi lignescente erectis 1 – 2-pedalibus virgatis; foliis linearibus uninerviis vix punctatis mucronatis aut integerrimis aut inferioribus hinc inde laciniato-dentatis; corymbis polycephalis; involucro 7 – 14-floro glabro disco dimidio breviore; squamis oblongis ovalibusque obtusis margine angustissime scariosis apice pl. m. viridulis; acheniis turbinatis brevibus sericeis. — *Linosyris Wrightii*, *heterophylla*, & *hirtella* Gray, Pl. Wright, 1, p. 95. — Southwestern Texas, on the Rio Grande and its tributaries, to the Gila, Arizona (Sutton Hayes). It varies considerably, and is not unlikely to pass into the next.

8. B. PLURIFLORA. Præcedenti similis; foliis anguste linearibus; capitulis parum majoribus; involucri 15 – 18-flori squamis lanceolatis acutis vel acutiusculis concoloribus. — *Linosyris pluriflora* Torr. & Gray, Fl. 2, p. 233. — Collected only by Dr. James in Long's Expedition, probably on the South Fork of the Platte.

9. B. LANCEOLATA. Fruticosa, puberula; foliis lineari-lanceolatis trinerviis scabrido-puberulis integerrimis mucronatis; corymbis polycephalis confertis; involucro 6 – 8-floro disco parum breviore, squamis oblongis, interioribus obtusis albidis, exterioribus brevibus subacutis farinoso-puberulis; appendicibus styli angusto-lanceolatis. — *Chrysothamnus lanceolatus* Nutt. l. c. *Linosyris lanceolata* Torr. & Gray, l. c. — Rocky Mountains, near the sources of the North Fork of the Platte, Nuttall, by whom only as yet has this well-marked species been collected.

+ + Folia angustissime linearia vel filiformia: capitula (lin. 3 longa) vel corymbuli sæpius paniculati.

10. B. Cooperi. Glabra, crebre punctata, glutinosa, fruticosa vel fruticulosa; foliis (ramealibus) lin. 3 – 4 longis lineari-filiformibus subcrassis obtusis; capitulis corymbulosis; involucro 6 – 7-floro, squamis 12 – 14 ovalibus oblongisque chartaceis omnino pallidis, intimis acutiusculis; corollæ limbo breviter 5-lobo; appendicibus styli deltoideo-ovatis parte stigmatica dimidio brevioribus; acheniis turbinatis sericeo-villosis æqualiter 10-costatis. — Southeastern California, on the eastern slope of Providence Mountain, Dr. J. G. Cooper.

11. B. diffusa. Glabra, parum glutinosa, obsolete punctata, basi fruticosa, diffuse ramosissima; ramis gracillimis; foliis (sub-semipollicaribus) fere filiformibus subcanaliculatis apice sæpe recurvis; capitulis glomerulisve 2 – 4-cephalis laxius paniculatis; involucro 5 – 8-floro, squamis 10 – 12 ovalibus oblongisque obtusissimis subcoriaceis margine tenuiter scariosis, apice pl. m. viridulo; corollæ limbo profunde 5-fido, lobis lineari-oblongis; appendicibus styli subovatis obtusis parte stigmatica multo brevioribus; acheniis lineari-turbinatis sericeo-hirsutulis 5-costatis; receptaculo ex alveolis intimis in paleolas aristiformes achenia subsuperantes producto: flores 1 – 2 marginales quandoque imperfecte ligulati. — *Ericameria diffusa* Benth. Bot. Sulph. p. 23. *Solidago* (*Euthamia*) *diffusa* Gray, Proc. Am. Acad. 5, p. 159. *Linosyris Sonoriensis* Gray, l. c. 8, p. 291; stylus perperam descr. — Cape San Lucas, in Lower California, Hinds, Xantus. Yaqui River (probably Yaqua River on the eastern side of the Gulf), Dr. E. Palmer.

12. B. arborescens. Glabra, resinoso-punctata, glutinosa; ramis e caule arboriformi 3 – 6-pedali erectis confertis scopariis foliosissimis; foliis (2 – 4-pollicaribus) angustissime linearibus demum marginibus revolutis filiformibus; corymbis conferte polycephalis paniculatis; involucro 20 – 25-floro discum subæquante; squamis pluriseriatis lanceolatis acutis tenuiter puberulis, carina tantum viridulo; appendicibus styli lanceolato-subulatis parte stigmatica parum brevioribus; acheniis brevibus turbinatis sericeo-pubescentibus 5-costatis: flores extimi raro ligulati. — *Linosyris arborescens* Gray in Bot. Mex. Bound. p. 79. — California, on dry ridges of the coast range, Santa Cruz to Tamalpais. Specimens collected by Professor Brewer above Santa Cruz show an attempt to produce a series of small ray-flowers: this, if at all normal, would remand this species to the *Euthamia* section of *Solidago*,

which it resembles, except in the woody stem, and the unequal more copious bristles of the pappus. The alveoli of the receptacle are produced into subulate teeth.

§ 3. CHRYSOTHAMNOPSIS. Involucrum 5 – 15-florum, cylindraceum; squamis lanceolatis acuminatis siccis (plerumque chartaceis nec herbaceo appendiculatis vel notatis) spiraliter imbricatis: corollæ limbus angusto-infundibuliformis breviter 5-lobus: appendices styli subutato-filiformes *Chrysothamni:* achenia angusta, elongata, sericeo-pubescentia: pappi setæ tenues subæquales: folia angusta, subtrinervia, integerrima. (Transitus ad *Aplopappum* per *A. Macronema.*)

13. B. BOLANDERI. Suffruticosa, humilis, subviscosa; ramis lana valde implexa adpressissima dealbatis; foliis spathulato-linearibus oblanceolatisve acutatis haud rigidis (circiter pollicaribus); capitulis subcorymboso- vel subracemoso-congestis plerisque folio seu bractea folioso stipatis; involucro 7 – 11-floro; squamis circa 10 lanceolatis sensim acuminatis nudis: alveoli receptaculi paleaceo-dentiformibus. — *Linosyris Bolanderi* Gray, Proc. Am. Acad. 7, p. 354. — Mono Pass in the Sierra Nevada, California. The narrow heads are three quarters of an inch long. This species is so obviously and closely related to *Aplopappus Macronema* (*Macronema discoidea* Nutt.), that it might be better to refer that plant to this genus, the line, wherever drawn, being almost arbitrary. Bolander found both at Mono Pass, and at nearly the same elevation.

14. B. HOWARDII. Suffruticosa, humilis, ramosissima, pl. m. lanata, mox glabrescens; foliis linearibus rigidis (1 – 2-pollicaribus) uninerviis, superioribus capitula pauciuscula subcongesta fulcrantibus paulloque superantibus; involucro 5-floro, squamis 12 – 15 oblongo-lanceolatis primum arachnoideis aut sensim aut extimis subito caudato-acuminatis; corollæ tubo parce villosulo. —*Linosyris Howardii* Parry in Proc. Am. Acad. 6, p. 541. — Var. NEVADENSIS. Rigidior; foliis latioribus sursum pl. m. dilatatis nunc obsolete trinerviis; involucri magis arachnoidei subviscosi squamis subcoriaceis, siccis apice recurvis. — *L. Howardii* var. *Nevadensis* Gray, l. c. — Gravelly soil in the "parks" of Colorado, extending to the Sierra Nevada, where it is chiefly the var. *Nevadensis*. Receptacle paleaceous-dentate, almost as in the preceding. The scales of the involucre, more numerous than in the preced-

ing and following species, are disposed to form 4 or 5 vertical ranks, in the manner of the next section.

15. B. Parryi. Suffrutescens, spithamæa ad pedalem, primum sublanata, mox glabrata; ramis tantum tenuiter lanato-dealbatis virgatis ad apicem usque foliosis; foliis linearibus (2 – 4 poll. longis lin. 1 – 2 latis) basi attenuatis plerisque trinerviis; capitulis in thyrsum angustum vel spiciformem foliosum congestis foliis fulcrantibus plerumque longius superatis; involucro 10 – 15-floro, squamis lanceolatis attenuato-acuminatis pauciseriatis nudis, extimis bracteantibus sæpius folioso-appendiculatis; corollæ tubo hirsutulo. — *Linosyris Parryi* Gray in Proc. Acad. Philad. 1863, p. 66. — Rocky Mountains of Colorado in the region of South and Middle Park. Heads rather numerous, shorter than in the two foregoing, only 6 to 8 lines long. Alveoli of the receptacle short and nearly entire.

§ 4. Chrysothamnus. (*Chrysothamnus* Nutt. excl. sp.) Involucrum 5-florum, angustum; squamis siccis carinatis pentastichis (raro tetrastichis), nempe in seriebus verticalibus strictis 5 (rarius 4) imbricatis: corollæ limbus angustus aut breviter aut profundius 5-lobus: appendices styli elongato-subulatæ vel filiformes hispidulæ, parte stigmatica lineari sæpius longiores: achenia angusta, linearia: pappi setæ tenues: folia angusta integerrima.

* Achenia glaberrima, 4 – 6-angulata, disco epigyno lato: involucri squamæ acuminatæ eximie pentastichæ, in utraque seriei verticali 5 – 6: capitula majuscula (ultra semipollicem longa), corymbuloso-conferta: corollæ lobi breves: pappus corolla longior.

+– Frutices ramosissimi ultrabipedales, ramis rigidis gracilibus scopariis.

16. B. Bigelovii. Subcinerea; ramis junioribus dealbatis; foliis marginibus revolutis filiformibus; involucri squamis chartaceis concoloribus modice carinatis appressis, exterioribus oblongo-lanceolatis lanoso-ciliatis acutiusculis, interioribus angustioribus plerumque acuminatis; pappi setis vix rigidulis. — *Linosyris Bigelovii* Gray in Bot. Whippl. p. 42, t. 12. — Above Albuquerque, New Mexico, Dr. J. M. Bigelow, and probably at a station farther north, Dr. Parry: Huefano plains, Colorado Territory, E. L. Greene. Notwithstanding the iteration, no objection will be taken, I trust, to continuing the dedication of

this species to its discoverer, Dr. J. M. Bigelow, because the genus was named for the veteran botanist Dr. Jacob Bigelow.

17. B. PULCHELLA. Undique glabra; foliis viridibus anguste linearibus uninerviis margine nunc serrulato-scabris, ramealibus subulatis; involucri squamis lanceolatis acutatis eximie carinatis fere coriaceis apice viridibus; pappi setis rigidulis. — *Linosyris pulchella* Gray, Pl. Wright. 1, p. 96, & Bot. Whippl. p. 43; Torr. in Sitgreaves' Rep. t. 4. — New Mexico, near the Rio Grande, etc. Heads nearly three quarters of an inch when in fruit and the pappus well developed, somewhat the largest of this section.

+ + Fruticulosa, ramis spithamæis simplicioribus e basi decumbente.

18. B. DEPRESSA. Glabra, scabrido-cæsia; foliis lanceolatis seu oblanceolatis mucronato-acutis brevibus (semipollicaribus) rigidis; involucri squamis elongato-lanceolatis sensim acuminatis lævibus chartaceis concoloribus; pappi setis rigidulis. — *Chrysothamnus depressus* Nutt. Pl. Gamb. p. 171. *Linosyris depressa* Torr. in Sitgreaves' Rep. p. 161. Mountains of the northern part of New Mexico: not "in the sierra of Upper California, as stated by Nuttall: Dr. Gambell's specimen is ticketed "Rocky Mountains." Dr. Parry collected it in 1867 in the Sangre de Christo Mountains, and recently Mrs. A. P. Thompson sent it from Kanab, Utah. Heads few in a terminal cluster, 8 lines long when fully developed.

* * Achenia sericeo-pubescentia: capitula numerosa, minora (haud ultra semipollicaria): involucri squamæ minus numerosa: pappus corollam raro adæquans.

+ Involucri squamæ caudato-acuminatæ.

19. B. CERUMINOSA. Fruticosa, fastigiato-ramosissima, bi – tripedalis, tenuissime lanuginosa, mox glabrata sæpeque resinoso-glutinosa; foliis filiformibus vel angustissime linearibus marginibus involutis, ramealibus sæpius hamato-recurvis; capitulis corymbuloso-fasciculatis; involucro glutinoso, squamis lanceolatis carinatis præter carinam viridulam in acumen aristiforme recurvum eximie productam pallidis; corollæ lobis lineari-lanceolatis; pappo haud copioso. — *Linosyris ceruminosa* Durand & Hilgard in Jour. Acad. Philad. n. ser. 3 (Pl. Heerm.) p. 40, & Pacif. R. R. Exped. 5, p. 9, t. 6. — Interior of California, at Tejon Pass, Dr. Heermann.

+ + Involucri squamæ apice obtuso incrassato viridi.

20. B. TERETIFOLIA. Fruticosa, subpedalis, ramosissima, glabra resinoso-glutinosa; ramis rigidis brevibus fastigiato-corymbosis; foliis filiformibus sursum sæpius crassioribus obtusis (semi–subpollicaribus) creberrime punctatis primum pruinoso-cæsiis mox vernicosis; capitulis subspicato-confertis; involucro angustissimo, squamis pallidis ad apicem parvum viridulum sæpius glanduligeris, interioribus oblongo-linearibus, extimis sensim ad bracteolas breves reductis; corollæ lobis brevissimis; pappo haud copioso. — *Linosyris teretifolia*, Durand & Hilgard, l. c. t. 7. California, on the mountains around Tejon Valley, Dr. Heermann; Arizona at Union Pass, Dr. E. Palmer (without flowers). Heads 5 or 6 lines long.

+– +– +– Involucri squamæ nec acuminatæ, nec apice viridulo notatæ, pauciusculæ, nempe in utraque seriei 3 – 4.

++ Folia resinoso-punctata, angustissima: capitula paniculata.

21. B. PANICULATA. Fruticosa? pruinoso-subcinerea vel glabra; foliis ramealibus lineari-filiformibus (vix semipollicaribus), summis brevissimis subulatis ramulisque resinoso-punctatis; capitulis laxiuscule paniculatis; involucri squamis oblongis obtusis tenuibus omnino pallidis minus carinatis, intimis achenia linearia vix superantibus; corollæ limbo ad medium usque 5-lobo; appendicibus styli subulato-filiformibus parte stigmatica duplo longioribus; pappo molli. — *Linosyris viscidiflora* var. *paniculata* Gray in Bot. Mex. Bound., p. 80. "California," Schott, probably in the southeastern part of the State: the station not recorded, and the specimen incomplete.

++ ++ Folia impunctata, angustiora uninervia, latiora trinervia: capitula corymboso- nunc subthyrsoideo-congesta.

22. B. GRAVEOLENS. Fruticosa, 1 – 4-pedalis, primum pl. m. lanata, tomento nunc copioso implexo derasibili nunc tenui evanescente; ramis virgatis; foliis aut angustissime linearibus mox involutis aut latioribus planis; capitulis semipollicaribus; involucri squamis oblongis vel lanceolatis obtusiusculis vel obtusis; corollæ limbo breviter 5-lobo; appendicibus styli subulato-filiformibus parte stigmatica longioribus; pappo satis molli. — *B. dracunculoides* & *B. Missouriensis* DC. Prodr. 5, p. 329. *Chrysocoma dracunculoides* (non Lam.) & *nauseosa* Pursh. *C. graveolens* & *nauseosa* Nutt. Gen. *Chrysothamnus dracunculoides* & *speciosus* Nutt. Trans. Amer. Phil. Soc. *Linosyris graveolens* & *albicaulis* Torr. & Gray, Fl. 2, p. 234. — Plains, etc., Western Arkansas to Dakota, and west to California and Washington Territory. — Exhibits

numerous inseparable forms, of which the most marked deviations from the general type are: —

Var. GLABRATA. (*Linosyris graveolens* var. *glabrata* Engelm.) Primum tomento tenui cinerea, mox glabrata viridis; involucri squamis sæpius angustioribus subacutis; corollæ lobis paullo longioribus.

Var. LATISQUAMEA. Involucri squamis latioribus obtusissimis; corollæ lobis brevissimis. — New Mexico, Dr. Bigelow, Dr. Henry. Inner scales papery and glabrous, the short outer ones tomentose.

Var. HOLOLEUCA. Undique cano-tomentosa, involucri squamis angustis obtusissimis; corollæ lobis brevissimis, tubo pilis parcis longis arachnoideis instructo. — Owens's Valley, interior of California, Dr. Horn. (No. 2852, distrib. Brewer.)

Var. ALBICAULIS. Caule dense lanato; foliis glabrescentibus; involucri squamis glabris obtusiusculis; corollæ lobis longiusculis, tubo pilis crebris longis arachnoideis villoso. — *Chrysothamnus speciosus* var. *albicaulis* Nutt. l. c. *Linosyris albicaulis* Torr. & Gray, l. c. — Rocky Mountains, Nuttall, Burke. In most flowers of the species there is a variable amount of short and stronger hairs on the tube of the corolla. In this they are peculiar for their length and cobwebby character. Traces of the same I have now met with in some different forms, notably in the preceding. The form of the corolla-lobes also varies unconformably with other characters, being in some no longer than broad, in others twice or thrice longer.

23. B. DOUGLASII. Fruticosa, subpedalis ad orgyalem, fastigiato-ramosa, glabra vel scabro-puberula (nunquam lanosa); foliis aut angustissime aut latiuscule linearibus lanceolatisve rigidulis; capitulis lin. 4 – 5 longis conferte cymosis; involucri squamis oblongis seu latiuscule linearibus obtusis; corollæ limbo ad medium usque 5-lobo; appendicibus styli angusto-subulatis parte stigmatica dimidio brevioribus; acheniis breviusculis deorsum angustatis; pappo satis rigidulo. — *Crinitaria viscidiflora* Hook. Fl. Bor.-Am. 2, p. 24. *Chrysothamnus viscidiflorus* & *pumilus* Nutt. l. c. *Bigelovia viscidiflora* DC. Prodr. 7, p. 279. *Linosyris viscidiflora* Torr. & Gray, l. c. — Colorado Territory and Wyoming to the Sierra Nevada, California, Oregon, and Washington Territory. In referring it back to *Bigelovia*, I venture to give a new specific name for this widespread species, the original one being misleading. For, although the involucre may occasionally be viscid with a resinous or balsamic exudation, it appears to be more generally free from it than any other species of the section; and the

flowers seem never to be viscid. Nor is Nuttall's name much more appropriate for a species which, though commonly low, is occasionally six feet high. It exhibits several but obviously confluent varieties, of which the following represent the extreme forms: —

Var. STENOPHYLLA; with very narrowly linear leaves, half a line wide. Northwestern Nevada, S. Watson in King's Expl.

Var. LATIFOLIA (*Linosyris viscidiflora* var. *latifolia* Eaton in Bot. King, p. 157), with oblong leaves 1 – 1½ inches long and half an inch wide. Northwestern Nevada, S. Watson. These two are glabrous forms.

Var. SERRULATA (*Linosyris serrulata* Torr. in Stansb. Rep.) has the margins of the leaves ciliate or as if serrulate with rigid, short bristles; otherwise glabrous or nearly so. A common form in the interior dry region.

Var. TORTIFOLIA; like the preceding, but the leaves twisted remarkably. Sierra Nevada, California, Brewer; Mt. Davidson, Nevada, Bloomer.

Var. PUBERULA (*Chrysothamnus pumilus* Nutt., pro parte. *Linosyris viscidiflora* var. *puberula* Eaton, Bot. King); with leaves, branches, etc., pulverulently or almost hispidly puberulent. Not rare in the interior districts.

§ 5. EUBIGELOVIA. (*Bigelowiæ genuinæ* DC.) Involucrum 3 – 4-florum, angustum; squamis paucis siccis flavidis oblongo-linearibus obtusis carinatis pentastichis vel subtetrastichis in utraque seriei 2 – 3: receptaculum parvum, alveolis subulato-dentiformibus, in centro longe cuspidatum: corollæ limbus ampliatus 5-fidus: appendices styli ovato-subulatæ, parte stigmatica breviuscula breviores: achenia brevia subturbinata: pappi setæ pauciusculæ, rigidulæ.

24. B. NUDATA DC. Mem. Comp. t. 5, & Prodr. 5, p. 329. Forma *spathulæfolia*, Torr. & Gray, l. c., &

Var. VIRGATA Torr & Gray, l. c. *B. virgata* DC. — Pine barrens in damp soil. Texas to New Jersey, near the coast.*

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* *Species Exclusæ.*

Linosyris squamata Gray in Proc. Am. Acad. 8, p. 290, is a *Senecionea*.

L. Texana Torr. & Gray Fl., is *Baccharis Texana* Gray, Pl. Fendl. p. 75.

L.? humilis Torr. & Gray, l. c. (*Crinitaria humilis* Hook.), is *Brachyactis*.

L. ramulosa Gray, Pl. Wright., is *Baccharis ramulosa* Gray, Pl. Thurb. p. 301.

L. carnosa Gray, Pl. Wright., 2, p. 80, is most probably an *Aster* of the *Oxytripolium* section, without rays.

ASTER. We should receive the genus in all the extent it now reassumes, *Machæranthera* included, although that on the whole well bears separation, as does *Diplopappus* section *Triplopappus*. But the separation of Nuttall's *Dieteria* from the section *Machæranthera* and its reference to *Euaster* does not seem to be called for. The general biennial or even annual character, which is foreign to true *Aster*, as well as the tendency to pinnatifid or incised leaves, belongs to both alike; the style-appendages are narrow in both; and the achenium of *Dieteria*, equally with that of *Machæranthera*, has several slender nerves on the faces, as well as a strong rib on each margin. I may here append the note, that —

ASTER TENUIFOLIUS Linn., as the Linnæan herbarium shows, and the character confirms, is founded on the plant known as *A. flexuosus* Nutt. To this alone (and not to Plukenet's plant) the phrase "pedunculis foliolosis" and the added descriptive notes relate.

ASTER SUBULATUS Michx. is truly the name to be preserved for our common northern maritime *Oxytripolium*, the original *A. linifolius* of Linnæus (Hort. Cliff. etc.) being really a *Galatella*.

ASTER ARENARIOIDES D. C. Eaton, in herb., is the name which should be borne by the plant described and figured as *Erigeron stenophyllum* Eaton in Bot. King, p. 152, t. 17 (not *E. stenophyllum* Gray, Pl. Fendl.), a species which most resembles *A. pauciflorus* Nutt. in its more slender form, but has only 2-nerved ovaries, a different glandulosity, etc. The akenes of *A. pauciflorus* are delicately 8 – 10-nerved. Bentham's character of *Oxytripolium* needs extending in this respect on account of more than one species.

BRACHYACTIS Ledeb. On the whole it seems clearly preferable to adopt this genus; but, as extended by Mr. Bentham, it includes two types, of somewhat different affinities. The original *B. ciliata* has lanceolate-subulate style-appendages, narrow and rather turgid achenia, with a large epigynous disk and marginal nerves rather inconspicuous, and a simple pappus of copious equal bristles. To this, as I long ago observed, belongs *Tripolium angustum* Lindl. But I confounded with it a second species, of more southern range, which Mr. Bentham has now distinguished (as var. *carnosula*, in Hook. Ic. sub 1106), and which has not only broader and more foliaceous involucral scales, but also distinct (purple) ligules much exceeding the style. As this must be Nuttall's *Tripolium frondosum*, although his specimens are too young to show it clearly, it may take the name of B. FRONDOSA. These two species were not unnaturally associated with *Aster* (*Oxytripolium*) *linifolius*, or rather *subulatus*.

Of the other species referred to the genus, I have had only *B. robusta* Benth. and the figure of *B. menthodora* to examine. The former is more conyzoid in the involucre, as well as in the small number of hermaphrodite flowers, has broad and obtuse style-appendages (as those of *B. menthodora* are represented), broader and flat achenia with prominent marginal ribs, and a pappus of two distinct sorts of bristles, those of the outer set not longer than the width of the achenium.

BOLTONIA L'Her. is made by Bentham to include my *Dichætophora;* but the Californian species referred to it (p. 209) proves to be *Perityle Acmella* of Pl. Fendl.

ERIGERON Linn. is maintained in the wide sense to which we are here accustomed. For our section *Stenactis*, Nuttall's name *Phænactis* is preferred, because Cassini's name was misapplied by Nees and by De Candolle, and both the original *Stenactis* (*Polyactis* Less.) and the leading one of Nees and De Candolle fall into *Phalacroloma.* That leaves the name free for the employment that was made of it; yet it is right and clearer to keep up Nuttall's sectional name. But the section itself does not very well hold out. As to *Woodvillæa*, the conjecture that it is *E. glaucum* was long ago positively confirmed.

E. ARMERIÆFOLIUM Turcz., in an authentic Siberian specimen examined, wholly wants the internal filiform pistillate flowers (De Candolle's and Turczaninow's remark which implies the contrary notwithstanding); and to it clearly belongs *E. glabratum* var. *minor* Hook. (a large form of which must be *E. lonchophyllum* Hook.), and *E. racemosum* Nutt., at least in part, — a species which is not uncommon in the Colorado Rocky Mountains and the Sierra Nevada. Hall and Harbour's 232 is a large form of it.

E. BELLIDIASTRUM Nutt. Some careless determinations of mine, confounding this with the very similar *E. divergens*, have misled Professor Eaton into altering the character of the species by assigning to it the double pappus of the latter. It has a simple and wholly deciduous pappus, and its achenium is tipped with a broad and white epigynous disk. Hall and Harbour's 246, Hall's Oregon 249, and the *E. Bellidiastrum* of Bot. King, p. 150, all belong to *E. divergens.* Besides the pappus, the receptacle in the more northern specimens of *E. divergens* is strongly convex. It is less or slightly so in some forms, especially in *E. cinereum* Gray, Pl. Fendl., which on the whole I cannot specifically distinguish. But *E. flagellare* Gray l. c. is perennial, at least by its stolons, and quite distinct.

E. URSINUM Eaton, in Bot. King, l. c., needs to be compared with *E. radicatum* Hook.

E. CÆSPITOSUM Nutt., a considerably leafy-stemmed species, more or less canescent, with a fine and chiefly spreading roughish pubescence, its leaves rather short, style-appendages extremely short and obtuse, minutely hairy akenes 2-nerved, or rarely 3-nerved, and the outer short pappus squamellate and conspicuous, has been more or less confounded with some other pretty well marked species, such as

E. NEVADENSE. Pube tenui appressa substrigosa pl. m. cinerea; caulibus e rhizomate elongato repente adscendentibus vel erectis; floridis scapiformibus vel apice nudis monocephalis 4 – 9-pollicaribus; foliis lineari-lanceolatis vel spathulato-linearibus integerrimis, imis elongatis (2 – 6-poll.) in petiolum attenuatis, caulinis acutis, summis ad bracteas subulatas diminutis; involucri squamis æqualibus hirsutis subglandulosisque (lin. 4 longis); ligulis 25 – 30 latiuscule linearibus albis (lin. 3 – 4 longis) uniseriatis; appendicibus styli ovatis acutis nunc acutissimis; acheniis oblongis pubescentibus ad margines tantum nervatis (seu radii 3-nervatis); pappo exteriore parco setuloso. — *E. cæspitosum* var. *grandiflorum* Eaton in Bot. King, p. 153, pro parte, nempe, no. 548, non Torr. & Gray. — Sierra Nevada, on the borders of the State of Nevada: near Virginia City, Bloomer; Mount Stanford, etc., Bolander, Kellogg; W. Humboldt Mountains, S. Watson.

Var. ? PYGMÆUM: foliis plerisque in caudice crasso confertis angusto-spathulato-linearibus (raro pollicaribus); scapis 1 – 3-pollicaribus; capitulo dimidio minore; involucro minus hirsuto; ligulis purpureis. — Above Ebbett's and at Mono Pass, California, alt. 9,500 to 10,750 feet, Brewer. Very likely a distinct species.

E. ARGENTATUM. Pube brevi molli adpressissima sericeo-incanum; caulibus e rhizomate (ut videter repente ?) erectis (spithamæis ad pedalem) simplicibus apice nudo monocephalis; foliis linearibus, imisve angusto-spathulatis in petiolum attenuatis, summis sparsis subulatis; involucri (lin. 4 alti) squamis lineari-lanceolatis, exterioribus brevioribus atque caulis canescentibus; ligulis plus 50 latiuscule linearibus albis (fere semipollicaribus); appendicibus styli brevissimis obtusissimis; acheniis (potius ovariis) crebre villosis 6 – 10-*nerviis;* pappo duplici, utroque copioso, exteriori squamellato-setoso interiore $\frac{2}{3}$ breviori. — *E. cæspitosum* Eaton, Bot. King, l. c. pro parte, nempe, no.

549. — Nevada, in the Pah-Ute Mountains, Ruby Valley, etc., alt. 5,000 to 6,000 feet, S. Watson. Pahranagat Mountains, Southeastern Nevada, Miss Searls.

E. CANUM Gray, Pl. Fendl., is well marked by its perfectly glabrous, narrow, conspicuously about 10-ribbed akenes. The pubescence, which is seldom as silvery as in the preceding, is somewhat strigose, and on the involucre loose or hirsute; the heads only half as large as those of *E. argentatum;* the rays narrower; style-appendages equally short and obtuse. This species proves to be more abundant than was supposed, I having confounded it with *E. cæspitosum.* New Mexico, Fendler, 375; Parry, 83 and 88 of coll. 1867. Wyoming, on the Platte, Geyer, 30, in part (the rest being *E. pumilum*). Colorado Territory, Hall and Harbour, no. 244, wrongly referred to *E. cæspitosum.*

E. STENOPHYLLUM Gray, in Bot. Whippl. p. 42 (98), from New Mexico, Dr. Bigelow, has achenia villous with long soft hairs and only marginal nerves, obtuse style-appendages, and a very copious simple pappus. The proper tube of the corolla in the disk is very short, the cylindrical throat sparsely villous.

Var.? TETRAPLEURUM has smaller heads and flowers, and mostly 4-nerved, rarely 2 – 3-nerved ovaries. The plant is more canescent, and the stems fork once or twice. It lies between *E. stenophyllum* and *E. filifolium.* — Southern Utah, Mrs. A. P. Thompson, Captain F. M. Bishop.

Eaton's E. STENOPHYLLUM, Bot. King, p. 152, t. 17, a homonym, is his *Aster arenarioides,* vide supra. Nuttall's earlier *E. stenophyllum* in Pl. Gamb. is his *E. foliosum,* with narrower leaves.

E. ERVENDBERGII. Strigoso-hirsutulum; caulibus e basi decumbente erectis gracillimis inferne crebre foliosis superne longe nudis monocephalis; foliis lanceolatis basi attenuatis integerrimis vix pollicaribus; involucri squamis subæqualibus strigoso-puberis; ligulis 50 – 60 angustis elongatis ut videtur albis; ovariis glabellis; pappo radii discique duplici, exteriori e setulis numerosis basi vix concretis diametro ovarii æqualibus, interiori e setis uniseriatis fragilibus subdeciduis. — Wartenberg, Mexico, Ervendberg, no. 69. Root not seen; slender stems a foot high. Head about as large as in *E. strigosum.*

E. DELPHINIFOLIUM Willd. Bentham, in Gen. Pl. p. 281, suspects that the New Mexican plant of Wright, no. 1170 (with which agrees Thurber's 771, and Palmer's 421 from Arizona), is different from the original Mexican species. The exterior pappus indeed consists of rather narrower and longer squamellæ; but otherwise I see no difference.

ACHÆTOGERON Gray, Pl. Fendl. p. 72. This is overlooked in the Genera Plantarum; else it would probably have been referred to *Erigeron* as a sort of *Phalacroloma* without bristles either in disk or ray. But technically, and perhaps with sufficient reason every way, it should hold its rank as a genus in the *Bellideæ*, just before *Myriactis*.

BACCHARIS. The receptacle is *conical* in *B. Douglasii* DC.

EVAX. The paleæ of the receptacle vary from strongly carinate-cymbiform in some species (as in *E. Heldrichii*, in which they are wholly pointless) to barely concave in others: in *E. perpusilla* there are subtending and partly enclosing paleæ for each sterile flower. Our Californian *Hesperevax* may very well remain in the genus; but it constitutes a marked subgenus, not only on account of the firm and at length rigid, comparatively persistent involucral scales and paleæ which are barely concave, but also on account of the receptacle. This is not correctly represented on the plate in Bot. Whippl. Exped. The body of it, on which most of the fertile flowers are borne, is rather convex than conical, beset with villous hairs, which are fully as long as the achenia, and abruptly produced at the centre into a narrow column, which bears very few or hardly any pistillate flowers and paleæ except near its base, while its summit bears a whorl of three to five, broadly ovate or obovate, blunt or sometimes mucronate, flat paleæ, of nearly herbaceous texture, more or less woolly inside, forming an involucre to the small cluster of hermaphrodite-sterile flowers, rigid and radiately spreading with age, at length deciduous. The achenia, moreover, are smooth (not papillose or glandular), clavate-obovate and decidedly obcompressed. The transverse brownish line above their base is marked in the coat of the seed. The diversity in the villosity of the receptacle, and the length and thickness of its elevated portion (being very slender, even filiform, and a line high, in no. 415 of Kellogg and Harford's collection), appeared to indicate more than one species, but I cannot make them out.

MICROPUS. The generic character in the Genera Plantarum by an oversight requires the fertile flowers to form only a single series. I should hardly change that; for the genus clearly appears to me to hold only the first two sections, and to rest on two good and peculiar characters: 1, the paleæ, which so completely and strictly enclose the achenia, are firm coriaceous or cartilaginous in texture, at length inclined to split into two valves; 2, the achenia are strongly gibbous, so that the style, with its filiform corolla, is lateral: the pappus wholly wanting. Consequently, —

STYLOCLINE Nutt., with straight or hardly oblique achenia having a terminal areola (as in all *Filagineæ* except *Micropus*), and with its other good characters, is to be restored: it will well include Bentham's section *Diplocymbium* and my *Ancistrocarphus*, thus constituting a genus of at least four species, thus: —

§ 1. EUSTYLOCLINE. S. GNAPHALIOIDES Nutt., S. MICROPOIDES Gray.

§ 2. DIPLOCYMBIUM. (*Micropus* sect. 3, *Diplocymbium* Benth.) Flores fœminei biseriati; paleis tenui-membranaceis extus lanosissimis, apice scarioso mutico, iis circa flores steriles angustioribus minus involutis. S. GRIFFITHII, *Gnaphalii* sp. Griffith, Notul. 4, p. 240, t. 468. Affghanistan, Griffith; no. 3220, 3221, Kew. distrib.

§ 3. ANCISTROCARPHUS. Flores fœminei 5–10 uni–biseriati, paleis cymbiformibus fere *Diplocymbii* (sed minus lanatis firmioribusque) obvoluti, steriles paleis 5 majoribus ovato-lanceolatis subfoliaceis apertis in cuspidem incurvam rigidam desinentibus persistentibus fructiferis delapsis stellato-patentibus. — S. FILAGINEA, *Ancistrocarphus filagineus* Gray, Proc. Am. Acad. 7, p. 356.

PSILOCARPHUS Nutt. The most important thing to note is, that the leaves, even from the base of the stem, are almost always opposite. *P. globiferus*, i. e. the Chilian *Micropus globiferus* of Bertero (*Bezanilla Chilensis* Remy), as well as I can judge from a single specimen, is distinguishable from the North American species by its less elongated (narrowly elliptical-oblong) as well as smaller achenia. The northern species seem to be reducible to two, *P. Oreganus* and *P. tenellus*. Var. *elatior* of the former (Oregon, Hall, no. 271, Kellogg and Harford, 418) is a remarkably luxuriant state, a span high, and erect.

FILAGO ARIZONICA. Floccoso-lanata, a basi ramosissima, diffusa (spithamæa); ramis proliferis filiformibus; foliis linearibus brevibus, caulinis plerisque glomerulos terminales et alares involucrantibus; capitulis ovato-pentagonis; floribus fœmineis 10–15 epapposis, hermaphroditis (sterilibus?) 5–10 papposis; receptaculi angusti paleis ovatis, fructiferis cymbiformibus dorso chartaceo lanosissimis, apice hyalino brevi obtuso, interioribus subplanis scarioso-hyalinis acutiusculis; acheniis lævibus. — Arizona, at Verde Mesa, Dr. Charles Smart, coll.

1867, received from Dr. Parry. Habit of *F. spathulata*, proliferously dichotomous; the branches filiform and becoming glabrous. Heads numerous in the capituliform clusters, a line and a half long. Fructiferous paleæ almost as deeply saccate as in *F. Californica*.

ANAPHALIS MARGARITACEA. We prefer the reference of *Gnaphalium margaritaceum* Linn. to this genus (standing between *Antennaria* and *Gnaphalium*), rather than to *Antennaria* by Brown, or to *Helichrysum* by Weddell. No. 300 of E. Hall's Oregon collection, inadvertently named *Gnaphalium leucocephalum* Gray, is a narrow-leaved form of our common Everlasting.

PTERIGOPAPPUS Hook, f. Although *Maia* of Weddell is referred to this genus in the Genera Plantarum, only the original Tasmanian species is mentioned. *P. compactus* from the Andes of New Grenada is the second species of this singularly distributed genus.

ADENOCAULON Hook. Bentham refers this genus to his *Millerieæ* in the tribe *Helianthoideæ*, with evident misgiving, remarking in his Notes on the order that it is a less perfect stranger there than by the side of *Tussilago*. That is true enough; but the wholly alternate leaves and naked receptacle are out of place there, and there is nothing but the sterile central flowers which favors the association. Upon a study of our species for the Californian flora, I find that its anthers, instead of "basi integræ vel vix minute bidentatæ," are strongly sagittate, in the manner of Bentham's diagram, no. 6, except that the five points of the auricles are obtuse, although quite as much produced. The style being conformable, it is clear to me that the genus should be transferred to the *Inuloideæ*, where, from its peculiarities of fruit, involucre, and corolla, it may form a subtribe, *Adenocauloneæ*.

AMBROSIA ARTEMISIÆFOLIA, etc. In his notes on Compositæ, and more briefly in Genera Plantarum, Bentham has cited an observation of Meehan, that in this plant "the inflexed setiform appendage is only to be found on anthers which do not present perfect pollen; the abundantly polleniferous anthers are broad, without horns." I find this appendage equally surmounting anthers that have been filled with pollen, and those that are so filled, only in the latter they are not so readily discerned. I have never seen any normal staminate heads with non-polleniferous anthers.

SILPHIUM GRACILE. Scabro-hispidulum; caule gracili striato 1 – 2-pedali mono – tricephalo subscapiformi; foliis radicalibus imisque caulinis ovato-oblongis membranaceis denticulatis utrinque acutis vel acuminatis longe petiolatis alternis, superioribus parvis paucis interdum oppositis lanceolatis sessilibus integerrimis; involucri squamis conformibus subæqualibus erectis ovato-lanceolatis ciliolatis basi nervosis; ligulis 12 – 15; acheniis cum ala latissima tenui orbiculatis sinu lato emarginatis lævibus. — Open woods, Texas, near Houston, Lindheimer (anno 1842, ex Engelmann), E. Hall, 1872. The radical leaves in Lindheimer's specimen are larger, 10 to 15 inches long, including the slender petiole, and pubescent beneath. Hall's plant has smaller leaves and less pubescence.

ZINNEÆ Benth. This subtribe of *Helianthoideæ* appears to be well founded, by Bentham, upon six Mexicano-North-American genera; and, as he remarks, our *Heliopsis* of the United States seems to hold its sessile ligules as persistently on the fruit as does the Mexicano-South-American species. But the use which is made of this character might call for the addition to the subtribe of a species which I long ago characterized as forming a subgenus of *Balsamorhiza*, and which has remained unnoticed, namely: —

BALSAMORHIZA (KALLIACTIS) CAREYANA Gray, Pl. Fendl. p. 81. In this the ligule becomes as dry and papery as in any *Zinnia*, and is equally persistent; but while the latter is continuous, the former has the short tube of the ligule evidently articulated with the summit of the achenium. The styles, etc., being exactly as in *Balsamorhiza*, the species ought not to be separated from that genus. But it further differs from all the other species in its cinereous-pubescent achenia.

WYETHIA Nutt. In a natural arrangement this genus should stand near to the preceding, to which it is much more related than to the proper *Helianthus*-group. The pappus is of the coroniform order, and perfectly continuous with the broad summit of the achenium, which is very obtusely quadrandular in the typical *Alarconia* and its near ally; the sides in all are nerved. The species, as far as known, are subjoined.*

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* WYETHIA Nutt. (ALARCONIA DC.)

§ 1. Achenia crassa, quadrata, angulis obtusissimis, pappo calyciformi 5 – 8-fido rigido coronata. Capitula magna, latissima, foliaceo-bracteata, seu involucrum foliaceum amplum. Folia lata, amplissima.

1. W. HELENIOIDES Nutt., Gray, Pl. Fendl. Tomentosa vel tomentulosa; acheniis cinereo-puberulis; dentibus corollæ disci extus parce hispidulis. *Alarconia*, DC.

2. W. GLABRA Gray, Proc. Amer. Acad. 6, p. 543. Glabra, glutinosa; acheniis glabris; dentibus corollæ disci brevioribus glaberrimis.

TITHONIA THURBERI. Caule gracili superne hispido; foliis ovatis indivisis; capitulo pro genere parvo; involucri squamis obtusis, exteri-

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§ 2. Achenia angustiora angulis acutis, disci saltem lateraliter compressa. Capitula mediocra, nuda, rarius basi foliata.

* Albo-tomentosa, vel demum glabrescens, foliis latis petiolatis, caule nunc ramoso.

3. W. OVATA Gray, l. c. 7, p. 357. Tomentoso-pubescens; foliis lato-ovatis cordatisque; involucri lato-hemisphærici squamis plurimis apice patentibus; pappo paleaceo-calyciformi brevi exaristato.

4. W. MOLLIS Gray, l. c. 6, p. 554. Albo-lanata, nunc glabrescens; foliis oblongis summisve ovatis reticulatis; involucri campanulati squamis 10 – 12 latioribus erectis discum superantibus; pappo præter coronulam truncatam 2 - 5-aristato.

* * Glaberrima, foliis angustioribus, caulinis sessilibus.

5. W. AMPLEXICAULIS Nutt. Involucrum campanulatum. Pappus vix ac ne vix aristiformis.

* * * Hirsuto-pubescens, foliis lanceolatis.

6. W. HELIANTHOIDES Nutt. Pygmæa, pube laxa subvillosa; involucro etc. subsequentis; pappo brevi exaristato rariusve arista unica gracili.—This is Nuttall's original *Wyethia*, founded on specimens, in flower only, collected by Wyeth "in the Valleys of the Rocky Mountains near Flat-Head River" (as it would appear in about lat. 47° long. 114°), to which Nuttall afterwards added a plant collected by himself "near the Blue Mountains of Oregon." The species is imperfectly known, and seems to differ from the next mainly in the awnless or occasionally one-awned pappus. I cannot well examine the interior of the single capitulum of Wyeth's specimen in our herbarium. A few separate flowers from one of Nuttall's own collecting are awnless.

7. W. ANGUSTIFOLIA Nutt. Spithamæa ad ultrapedalem; foliis radicalibus elongatis utrinque attenuatis; involucro polyphyllo patente, squamis plerisque foliaceis lato-linearibus nunc subspathulatis sæpius obtusis aut undique aut ad margines pilis longis hirsutis; acheniis interioribus 1 – 2 extimis sæpius 3 - 4-aristatis, arista valida hirta. *Alarconia angustifolia* DC. *Wyethia robusta* Nutt. is merely one of the larger forms of this common species of California and Oregon.

8. W. ARIZONICA. Pedalis, scabro-hirsuta; caule 1 – 2-cephalo; foliis oblongo-lanceolatis integerrimis, superioribus sessilibus; capitulo parvulo; involucro hemisphærico, squamis oblongo- seu ovato-lanceolatis (ut videtur erectis) pilis brevibus cinereo-hirsutis; corollæ dentibus extus hispidulis; ligulis circiter 10 (subpollicaribus); acheniis immaturis fere præcedentis. In pine woods and bottoms, near Bear Springs, Northern Arizona, Dr. E. Palmer. Also Southern Utah, Captain F. M. Bishop; a less hirsute form.

**** Hispido-scaberrima, foliis linearibus, ligulis nullis ?

9. W. SCABRA Hook. Lond. Jour. Bot. 6, p. 245; Gray in Bot. Whippl. p. 46 (102). This little known species of Utah ? and New Mexico, is peculiar in habit, and perhaps in the absence of rays; very likely it is not of this genus.

oribus parce hispidis breviter foliaceis; ligulis brevibus aurantiacis; pappi squamellis lineari-oblongis coriaceis, aristis parum scabris. *T. tubæformis* Bot. Mex. Bound. p. 90, non Cass. — Magdalena, in the Mexican province of Sonora, Thurber, no. 910. This species is indicated by Bentham, in Gen. Pl. p. 375. In the genus now reduced to its natural proportions and well characterized, it is the smallest flowered species, the heads being only half an inch long, and the ligules short.

FLOURENSIA DC. As to *F. corymbosa*, if C. Gay's plant of the name is genuine, it is clearly a *Viguiera* (as that genus is now well characterized by Bentham), and the character "achenia villosissima" (DC) is not applicable, as it is to the genuine species. These I cannot regard as belonging to *Helianthus*. They appear to be quite different in habit, and hardly less so in the style, corolla, and achenia; and the pappus, seemingly not caducous even in *F. thurifera*, is marcescent in the more genuine discoid species, *F. laurifolia*, and persistent in the anomalous *F. cernua*. *F. laurifolia* and *F. thurifera* are not so very dissimilar in habit; both have the chaffy awns of the pappus disposed to be trifid, and want the accessory nerves to the corolla. *F. cernua*, which shows these nerves, but is otherwise most unlike *Helianthus*, and has turgid instead of flat achenia, still accords with *Flourensia* in most respects.

ENCELIA Adans. The combination which I had proposed of *Geræa* and *Barrattia* with *Sinisia* is justly carried a step further by referring all these to sections of *Encelia*. I have detected rudimentary awns to abortive ray-achenia in specimens which in Bot. Mex. Bound. I had referred to *E. conspersa* Benth. (a species still obscure), but should now regard as a mere variety of *E. Californica*. This species is distinguished from the Chilian *E. oblongifolia* by the leaves more obtuse at base, and the achenia with a much shallower emargination. The species of the section *Geræa* are: —

ENCELIA (GERÆA) NUDICAULIS. Herbacea, pube brevi densa argenteo-canescens; foliis omnibus radicalibus orbiculatis integerrimis basi 3–5 nervata in petiolum nudem latiusculum longum subito angustatis; scapo subpedali prorsus nudo monocephalo; involucri incani lati squamis triseriatis lanceolatis discum subæquantibus; ligulis ultra 20 lanceolatis pollicaribus cum floribus disci aureis; acheniis obovatis undique villosissimis marginibus apiceque callosis; pappo ex aristis 2 subulatis sat validis pilos haud superantibus et squamellis intermediis minimis plurimis e membranulo fere continuo brevissimo ortis. —

— Utah, probably in the southern part of the Territory, Captain F. M. Bishop. This remarkable species, with head fully as large as that of *Æ. Californica*, on a perfectly naked scape, departs a little from the generic character in having minute and short somewhat membranaceously connected squamellæ between the awns, of which mere vestiges persist on the mature achenium.

ENCELIA (GERÆA) ARGOPHYLLA. This is the name which must be borne by a close congener of the preceding, the *Tithonia argophylla* of Eaton in S. Watson, Bot. King, p. 423, if the most scanty materials on which it was founded belong to one plant, as is likely. The foliage described consists of tufts of radical leaves, which are exceedingly silvery-white with a very dense and close-pressed, short, soft silky down, all rhombic-spatulate with long-tapering base and abruptly acuminate or acute apex. The separate and fragmentary head, so far as the means of comparison exist, might be identical with that of the preceding species at maturity. Its achenia are four lines long; the very numerous and fine intermediate squamellæ are, however, apparently more setulose. "Dr. Palmer describes the stem as erect, two or three feet high, leafy, with cauline leaves similar to the radical ones." He informs us that it was found at St. George, in Southern Utah.

ENCELIA (GERÆA) ERIOCEPHALA, *Simsia canescens* Gray, Bot. Mex. Bound. p. 89, the specific name changed on account of the old *Encelia canescens*. It is remarkable for the long and white villous hairs which densely fringe the lax and linear-lanceolate herbaceous scales of the involucre; and the awns of the pappus are naked.

ENCELIA (GERÆA) FRUTESCENS, *Simsia frutescens* Gray, l. c., to the character of which it should be added that the rays are more commonly present, 6 to 12 in number, and 3 – 4-lobed.

ENCELIA (GERÆA) SCAPOSA, *Simsia scaposa* Gray, Pl. Wright. 2, p. 88. Still known only from Wright's New Mexican collection. The disk-corollas are yellow; the thin chaff of the receptacle acutish. — Nearly related to this is

ENCELIA (GERÆA) MICROCEPHALA. Herbacea, puberula; caulibus e radice perenni erectis strictis pedalibus apice corymboso-oligocephalis; foliis scabro-hispidulis integerrimis subcoriaceis, radicalibus cum caulinis infimis oppositis spathulato-lanceolatis obtusis triplinerviis in petiolum attenuatis, cæteris minoribus alternis lineari-lanceolatis (subpollicaribus), superioribus sensim decrescentibus; involucri campanulati disci brevioris squamis oblongis gradatim imbricatis subcori-

aceis; ligulis paucis (flavis) brevibus; disci corollis atro-purpureis, paleis obtusissimis vel truncatis; acheniis (immaturis) undique villosissimis 1 – 2-aristatis, aristis basi villosissimis. — Sierra Abayo, New Mexico? Dr. Newberry in McComb's Expedition. Heads 2 to 4, on rather short peduncles, only 4 lines high; the oblong rays hardly exceeding the disk.

ENCELIA (GERÆA) ALBESCENS. Herbacea? pube sericea brevi scabrida argenteo-canescens; foliis (ramealibus) alternis ovato- seu lanceolato-oblongis subintegerrimis basi subcuneata trinervatis breviter petiolatis; capitulis solitariis longius pedunculatis; involucri biserialis squamis lanceolatis æqualibus canescentibus; floribus luteis; ligulis 8 – 10 obovatis majusculis; paleis receptaculi acutis; acheniis (immaturis) cuneato-oblongis præter margines creberrime sublonge ciliatos fere glabris; pappo 1 – 2-aristellato nudo. — In the western Mexican province of Sonora, Dr. Edward Palmer, coll. 1869, no. 21. Leaves in the specimen less than an inch long, the short petioles not dilated at base. Rays half an inch long. Young achenium slightly emarginate at the apex, the dense ciliate hairs of the margin in length scarcely equalling half its width, or at the summit rather longer, and about half the length of the longer delicate naked awn of the pappus, the other awn seldom longer than the hairs, often shorter or obsolete. In aspect and in the nature of the pubescence this very much resembles another scarce Composita of the same region, namely, *Viguiera nivea* (supposing it to be the *Encelia nivea* of Bentham, Bot. Sulph.), the plant described by me in Bot. Mex. Boundary as *Helianthus tephrodes.* That, by the pappus and ovary, is evidently a *Viguiera.* The present plant is a good *Encelia,* of the *Geræa* section by the pappus, although the awns are unusually delicate and one of them inclined to disappear. The villous ciliation of the achenium, although shorter than in its congeners, is too long and dense for a *Simsia.*

ENCELIA (BARRATTIA) CALVA, *Simsia calva* Gray, Pl. Lindh. 2, p. 228, is remarkable for the pair of foliaceous stipule-like appendages at the base of uniformly opposite leaves. These are altogether wanting in

ENCELIA (BARRATTIA) GHIESBREGHTII. Herbacea? ramosa; ramis gracilibus foliosis; foliis omnibus oppositis angusto-ovatis acuminatis rariter serratis basi truncatis vel subcordatis supra hirtello-velutinis subtus molliter canescenti-sericeis; petiolis brevibus inappendiculatis; involucro campanulato *Simsiæ,* squamis lineari-subulatis villosis

glandulosisque, interioribus discum adæquantibus; floribus luteis, ligulis 10 – 12 oblongis (subtus lividis?); paleis receptaculi cuspidato-acuminatis; acheniis (immaturis) oblongis glaberrimis apice truncatis calvis. — Mountain forest near Chiapas, S. Mexico, Ghiesbreght, no. 568, of recent distribution; very scantily collected. Branches slender, glandular-scabrous and beset with spreading villous or hirsute hairs. Leaves one or two inches long, the pubescence appressed, that of the lower surface especially soft and satiny. Involucre half an inch high. Rays barely half an inch long. Mature akenes not seen; the immature ones flat, truncate at summit, not at all emarginate or bidentate.

Coreopsis Linn. In the Genera Plantarum this genus is probably extended too far when made to comprise groups of species with fertile rays. At least in the Flora of California I am constrained to reinstate two genera which are peculiar to that region, and in which no true *Coreopsis* occurs, although, indeed, the genus does cross the Rocky Mountains and reach the Pacific in a single species farther north. As to the African section *Prestinaria*, it might be associated with, or form a part of *Diodonta*. *Epilepis* Benth., the rays of which are said in the Genera Plantarum to be fertile, but are more correctly described in Plantæ Hartwegianæ as neutral, and those opposite-leaved South American species which I once associated with *Agarista*, I should still regard as belonging to *Coreopsis*, while I would re-establish the California genus, under the name of

PUGIOPAPPUS Gray.

Capitulum multiflorum, heterogamum; floribus radii 7 – 10 fere semper *fœmineis*, disci hermaphroditis. Involucrum duplex *Coreopsidis*. Receptaculum planum, paleis scariosis cum fructu deciduis onustum. Ligulæ latæ, truncatæ, plurinerviæ. Corollæ disci tubo tenui versus apicem annulato, limbo ampliato 5-lobo. Styli fl. radii breves, nunc intra tubum ligulæ retracti; fl. disci ramis cono brevissimo superatis. Achenia plano-obcompressa, ovalia vel oblonga, radii glaberrima, marginata vel alata, calva; disci villosa vel ciliata, cum palea receptaculi adpressa basi cohærente decidua, pappi aristis paleolisve longis triquetris pugioniformibus superatis. — Herbæ annuæ, Californicæ, glaberrima, foliis alternis 1 – 2-pinnatipartitis, lobis linearibus, capitulis solitariis longe pedunculatis, floribus aureis. — *Agarista* DC. Prodr. 5, p. 569; Torr. & Gray, Fl. 2, p. 337, non Don. *Pugiopappus* Gray in Bot. Whippl. p. 48, & Proc. Amer. Acad. 6, p. 545.

It was long ago remarked, in the Flora of North America, that ovaries of the ray in *Agarista calliopsidea* DC. are ovuliferous. I have lately seen, in a cultivated plant, that they are equally if not more fertile than those of the disk. The specimens under cultivation showed well-formed styles to the ray-flowers; but these I find are present in all the indigenous specimens I possess, although commonly short or even included in the tube. *Agarista* DC. and *Pugiopappus* are therefore congeneric. As Don's *Agarista* in *Ericaceæ* is earlier, and is to be restored, the present reinstated genus naturally takes the name of *Pugiopappus*. The species are: —

PUGIOPAPPUS CALLIOPSIDEA. Caule 1–2-pedali inferne folioso; capitulo majore; involucri exterioris squamis ovatis basi coalitis; ligulis cuneato-obovatis (semipollicaribus ad pollicarem); disci corollis tubo piloso-annulato; achenis radii latis ala tenui cinctis, disci margine intusque longe mollissime villosis. — *Agarista calliopsidea* DC.

PUGIOPAPPUS BREWERI. Minor; foliorum lobis angustissime linearibus; involucri exterioris squamis linearibus; ligulis oblongo-spathulatis (semipollicaribus); annulo corollæ disci obscuro imberbi; acheniis radii præcedentis, disci secus margines costamque paginæ interioris tantum longe villosis; pappi aristis validioribus achenio dimidio brevioribus. — This is the plant, collected by Professor Brewer (no. 241) "on dry hills at San Buenaventura," below Santa Barbara, which in Proc. Am. Acad. 5, p. 545, I wrongly referred to *P. Bigelovii*. It is nearer the preceding.

PUGIOPAPPUS BIGELOVII Gray, l. c. Humilis; foliis subradicalibus carnosulis, segmentis paucis angustissime linearibus; capitulo in pedunculo scapiformi parvulo; involucri exterioris squamis lato-linearibus; ligulis quadrato-oblongis; annulo corollæ disci imberbi; acheniis radii oblongis ala crassiuscula marginatis, disci (ut videtur plerumque sterilibus) tenuiter ciliatis. — The style in the disk-flowers is articulated above the base, and the thickish basal portion is less deciduous, in all three species. In those, also, the disk-achenia, or some of the central ones, are disposed to be infertile.

LEPTOSYNE DC., with its three genuine species and *Tuckermannia* of Nuttall, which I long ago referred to it, has perhaps still greater claim to be regarded as a good genus. *L. Douglasii* DC., *L. Stillmanii* Gray, and *L. Newberryi* Gray, differ chiefly in some details of flowers and fruit; in the latter the cup or little border which answers to pappus is almost obsolete. There is no trace of it in the remarkable section *Tuckermannia*, *L. maritimia* Gray, which is reinforced by a succulent woody-stemmed species of the Californian Islands, *L. gigantea* Kellogg. This, however, has not yet flowered here in cultivation. It may be only an insular variety of the other.

Although not here in its proper place, I close the present portion of this article with the characters of the following interesting genus: —

MESONEURIS, Nov. Gen. *Senecionidearum*.

Capitulum homogamum, multiflorum, floribus hermaphroditis tubulosis. Involucrum campanulatum, bracteolis lineari-filiformibus paucis laxis stipatum; squamis 12 – 15 biseriatis æqualibus oblongo-lanceolatis, medio concavis subherbaceis 3 – 5 nerviis, basi incrassatis (carnosis?) marginibus pl. m. scariosis. Receptaculum convexiusculum, epaleatum, fimbrillis subulatis inter flores. Corollæ hypocraterimorphæ; limbo usque ad tubum angustum æquilongum 5-partitum, lobis linearibus marginibus æstivatione induplicatis, medio nervo valido percursis, nervis intramarginalibus tenuissimis. Stamina fauci inserta: antheræ lineares, basi breviter bidentatæ. Styli rami crassiusculi subcomplanati, extus puberi nervo medio valido percursi, apice subtruncato magis hirtelli. Achenia cylindracea, enervia, areola epigyna (modo *Senecionum*) annulo magno incrassato circumdata. Pappus e setis rigidulis scabris uniserialibus corollæ tubum haud superantibus. — Herba austro-Mexicana, foliis alternis bipinnatifidis, petiolo basi spathaceo-auriculato caulem amplectente, capitulis cymosis, floribus albis.

M. BIPINNATIFIDA. — Mexico, in the cold region of the mountains, province of Chiapas, Ghiesbreght, no. 805 of new collection. — somewhat robust perennial, two or three feet high, and probably often taller, with some lax and deciduous pubescence, woolly-tufted at the base of the stem. Lower leaves a foot long, including the petiole; the foliaceous sheathing auricle an inch or two in length; uppermost leaves reduced to these spathaceous sheaths. Heads half an inch long. Lobes of the corolla 2 lines long; the tube 5-nerved below, the nerves as usual running to the sinuses, their continuation within the margin of the lobes very slender: the median nerve of the lobes more prominent than in the other and rare cases in which it is manifest at all, but gradually vanishing after reaching the tube. The genus is a remarkable one on several accounts (and doubtless Senecioneous although the corolla recalls *Hymenothrix*): in deriving the name from the nervation, I have taken the less-used diminutive *νευρῖς*, so as not to come too near *Mezoneuron*.